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Southern Medical Association, Fortieth Annual Meeting, Miami, Florida, November 4-7

TABLE OF CONTENTS

Carcinoma of the Fundus Uteri. Robert J. Crossen, St. Louis, Missouri 445
Discussed by J. Milton Singleton, Kansas City, Missouri; William T. Kennedy, New York, New York; J. I. Hofbauer, Cincinnati, Ohio; H. A. Gamble, Greenville, Mississippi.

Periarteritis Nodosa: Clinical Manifestations and Postmortem Findings with a Report of Six Cases. Wm. H. Higgins, Richmond, Virginia 453
Discussed by Jas. Asa Shield, Richmond, Virginia; T. Dewey Davis, Richmond, Virginia; Pearl M. Zeek, Cincinnati, Ohio; M. Pinson Neal, Columbia, Missouri.

The Effect of Transthoracic Vagotomy Upon the Functions of the Stomach and Upon the Early Clinical Course of Patients with Peptic Ulcer. K. S. Grimson, H. M. Taylor, J. C. Trent, D. A. Wilson and H. C. Hill, Durham, North Carolina 460
Discussed by Max M. Zinniger, Cincinnati, Ohio; R. L. Sanders, Memphis, Tennessee; A. J. Carlson, Dayton, Ohio; William F. Rienhoff, Jr., Baltimore, Maryland.

The Use of Perforated Acrylic Implants Following Enucleation. George M. Haik, New Orleans, Louisiana 473

Failure of Lipid Metabolism: Proctologic Significance. Mark M. Marks, Kansas City, Missouri 477
Discussed by Edward G. Martin, Detroit, Michigan; Curtice Rosser, Dallas, Texas.

Primary and Secondary Metastases from Cancer of the Colon and Rectum. William H. Daniel, Los Angeles, California 480

Use of Neostigmine (Prostigmine) in Subacute Poliomyelitis. Charles J. Frankel and Robert V. Funsten, Charlottesville, Virginia 482
Discussed by H. R. McCarroll, St. Louis, Missouri.

Importance of Vitamins of the B Complex in Clinical Medicine. Grace A. Goldsmith, New Orleans, Louisiana 485
Discussed by Edgar Jones, Nashville, Tennessee; C. A. Mills, Cincinnati, Ohio.

North Carolina School-Health Coordinating Service. E. H. Ellinwood and W. P. Jacocks, Raleigh, North Carolina 493
Discussed by (Miss) G. Bush, Columbus, Ohio; C. A. Wilzbach, Cincinnati, Ohio; Felix J. Underwood, Jackson, Mississippi.

Some Future Problems in Allergy. Francis M. Rackemann, Boston, Massachusetts 497

The Disabled, The Physician and Employment. Howard A. Rusk, New York, New York 501
Discussed by D. A. Henderson, Charleston, West Virginia; A. Wiley, Dayton, Ohio.

Industrial Health: A Report from the Field. Carl M. Peterson, Chicago, Illinois 507

Common Skin Diseases in Children. Lee Bivings, Atlanta, Georgia 511

Continued on Next Page

TABLE OF CONTENTS
Continued

Pre-Measles Encephalitis. Jay M. Arena, Durham, North Carolina 513
Discussed by Gilbert J. Levy, Memphis, Tennessee; Edward W. Stevens, West Palm Beach, Florida; J. A. Toomey, Cleveland, Ohio; Lee Bivings, Atlanta, Georgia.

Experiments in Medical Education and Medical Care in a New Medical School. C. C. Carpenter, Winston-Salem, North Carolina 515

EDITORIALS 519
Miami is the Place
Marihuana Addiction
Ovary and Adrenal
Twenty-Five Years Ago

OFFICERS, Southern Medical Association and organizations meeting conjointly 522

MIAMI—WHERE WE MEET 523
Recreation. Mr. Benton E. Jacobs, Miami, Florida.

BOOK REVIEWS 524

SOUTHERN MEDICAL NEWS 525

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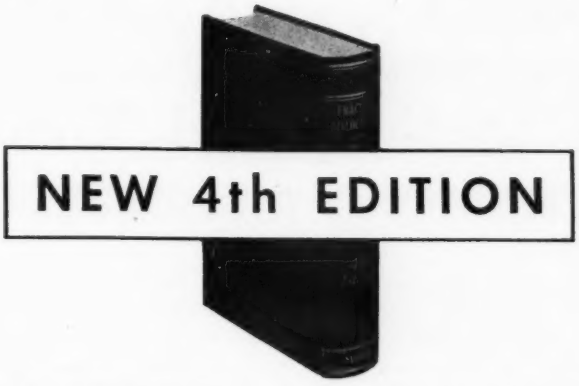

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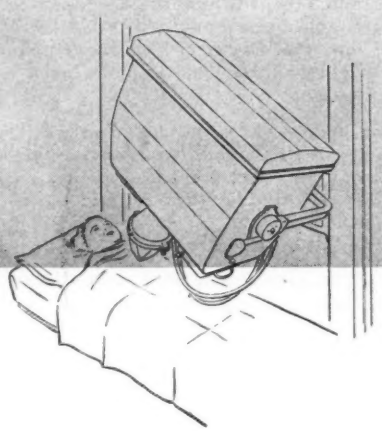
Bean, W. D., Spies, T. D., Vilter, R. W.:
Am. J. Med. Sc., 208: 46 (July) 1944



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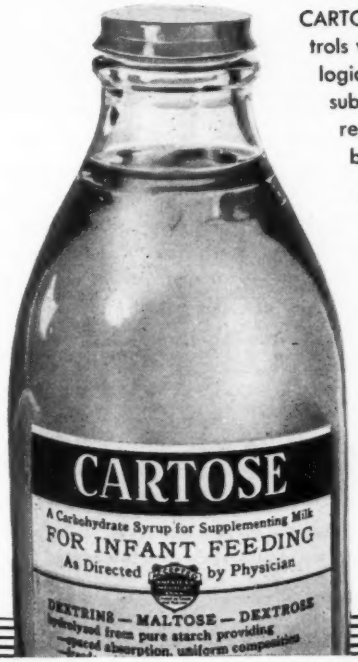

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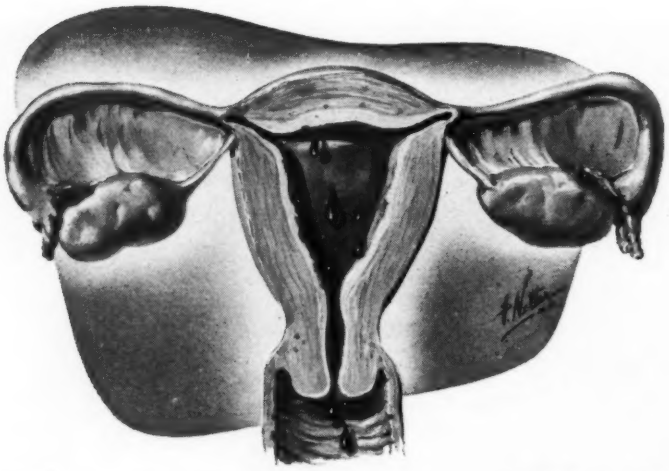

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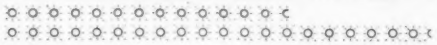

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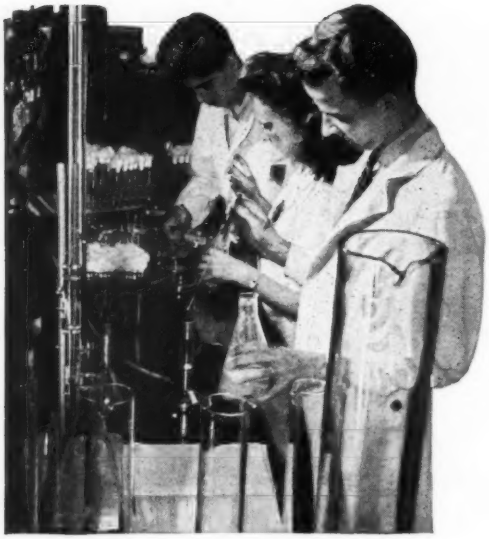

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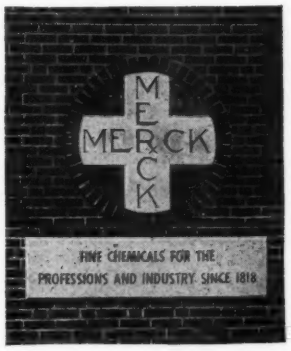

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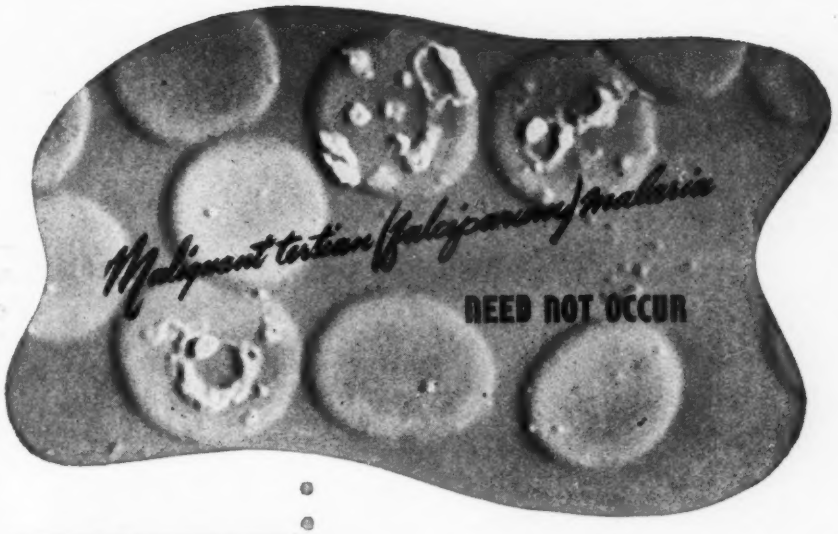

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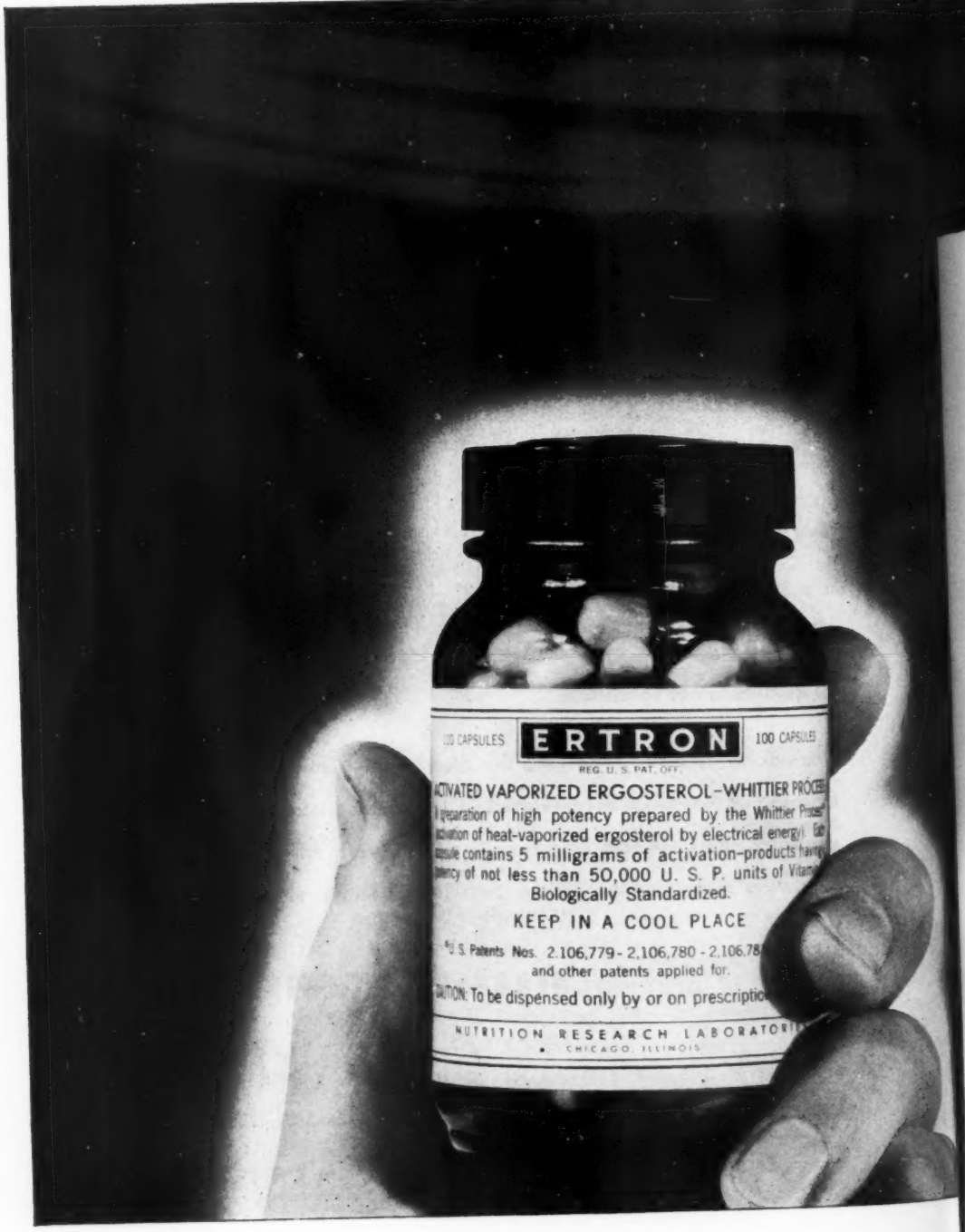
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Metamucil is the highly purified, non-irritating extract of the seed of the psyllium, Plantago ovata (50%), combined with anhydrous dextrose (50%). It mixes readily with liquids, is palatable, easy to take.

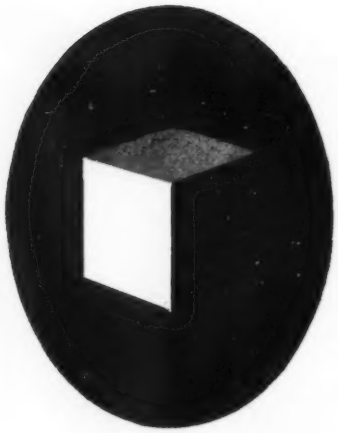
Supplied in 1-lb., 8-oz. and 4-oz. containers.

Metamucil is the registered trademark of G.D. Searle & Co.

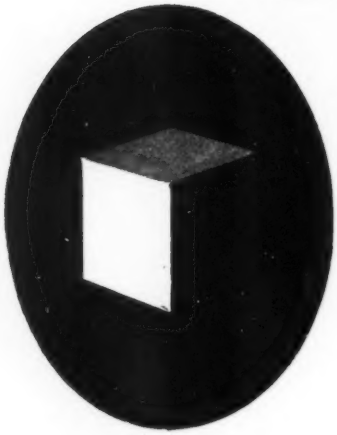
ACCEPTED AMERICAN MEDICAL ASSN

SEARLE

RESEARCH IN THE SERVICE OF MEDICINE



in clear relief



Protruding in bold relief from the adjacent tissues, rectal hemorrhoids frequently obscure less well-defined pathology located higher in the ano-rectal area. To avoid all error while providing relief—in the clear—the physician may avail himself of the palliative, yet safe actions of 'ANUSOL'* Hemorrhoidal Suppositories. Containing no narcotic, anesthetic or analgesic drugs to mask the symptoms of more serious rectal pathology; no styptics or hemostatics with attendant danger of thrombosis; and no vasoconstrictors to produce systemic side effects, 'ANUSOL' Hemorrhoidal Suppositories permit continued function of sensory warning mechanisms. Simultaneously, they permit early *and* safe relief by means of decongestion, lubrication and protection.

Schering & Glatz, Inc., *a subsidiary of*

WILLIAM R. WARNER & CO., INC., 113 WEST 18TH STREET, NEW YORK 11, N. Y.

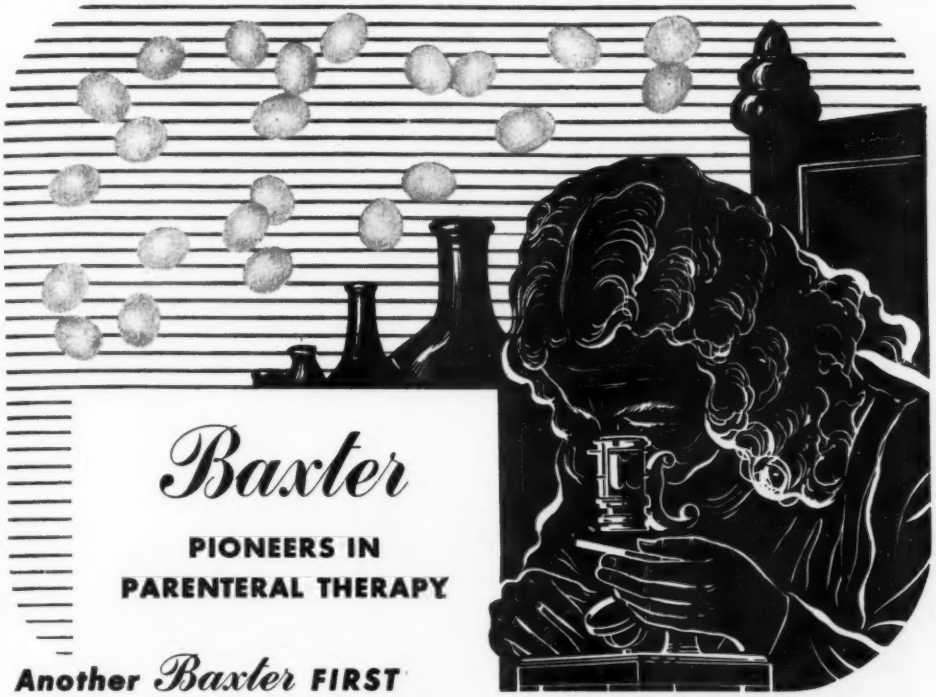
'anusol'

*Trademark Reg. U. S. Pat. Off.

Available in boxes of 6 and 12 suppositories.

Hemorrhoidal Suppositories

PIONEERING THAT POINTS TO *DISCOVERY* . . . *DISCOVERY* THAT *DEMANDS* LEADERSHIP



Baxter

PIONEERS IN PARENTERAL THERAPY

Another *Baxter* FIRST

. . . a Flexible Program

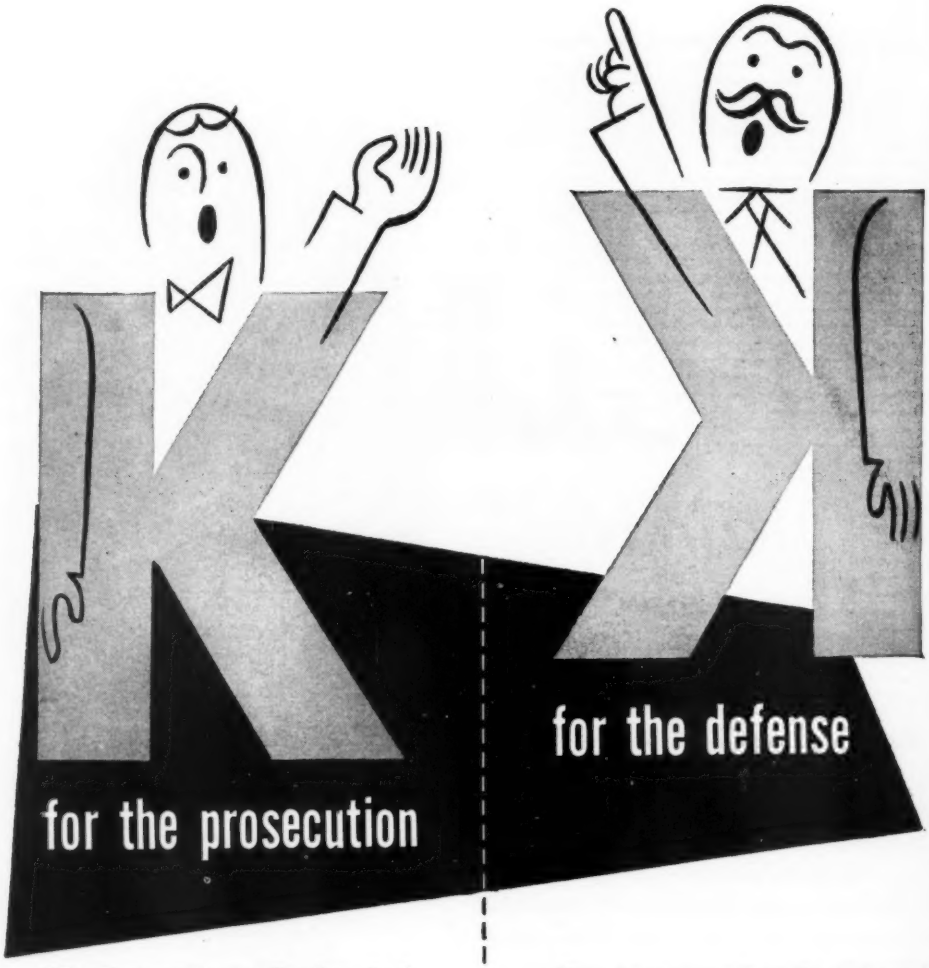
In 1934 Baxter introduced the 500 cc. Vacoliter, eliminating unnecessary waste of large amounts of intravenous solution, particularly in pediatrics. This was the first of many steps to provide flexibility to the Baxter program. Baxter's many years of pioneering and leadership in the field of parenteral therapy are your protection. Here is a parenteral program complete, trouble-free and confidence-inspiring. No other method is used in so many hospitals.

Manufactured by
BAXTER LABORATORIES, INC.
Glenview, Illinois; Acton, Ontario; London, England

Antonj van Leeuwenhoek
1632-1723
This great microscopist in 1674 gave the first description of the red blood cells and demonstrated the capillary anastomosis between the arteries and veins, previously discovered by Malpighi in 1661. His extensive studies on capillary circulation completed Harvey's demonstration of the circulation, preparing the way for today's parenteral therapy.

Distributed east of the Rockies by
AMERICAN HOSPITAL SUPPLY CORPORATION
CHICAGO • NEW YORK

Produced and distributed in the Eleven Western States by DON BAXTER, INC., Glendale, Calif.



Offending agents in diarrhea, both bacteria and toxins, are relentlessly trapped by the powerful adsorptive action of Kaopectate.*

Kaopectate envelops the inflamed mucosa in a soothing, demulcent coating — protecting against further assault. Simultaneously, consolidation of stool and return to more normal bowel function are enhanced by its characteristic hydrophilic properties.

DOSAGE: Kaopectate should be given after each bowel movement. For adults—two to eight tablespoonfuls. For children—one or more teaspoonfuls according to age. *Available in 10 fluidounce bottles.*

Each fluidounce contains: Kaolin . . . . . 90 grains
Pectin . . . . . 2 grains

*Trademark Reg. U. S. Pat. Off.

Upjohn
KALAMAZOO 99 MICHIGAN

FINE PHARMACEUTICALS SINCE 1886

kaopectate

The water's fine . . .

but how about the *milk?*

CLOSE at hand is the summer of the Great Revival of vacations long inhibited by war. Seaside cottages, mountain cabins, camps by lake or stream, and swarming motorways will recall their thousands . . . to regions where milk *quality* is often an unknown quantity.

And physicians will be asked, "What milk is *safe* for the baby, or the children, while we're away from home?" How can they be *assured* of protection from milk-borne infections? A simple, practical answer is to use Carnation Evaporated Milk.

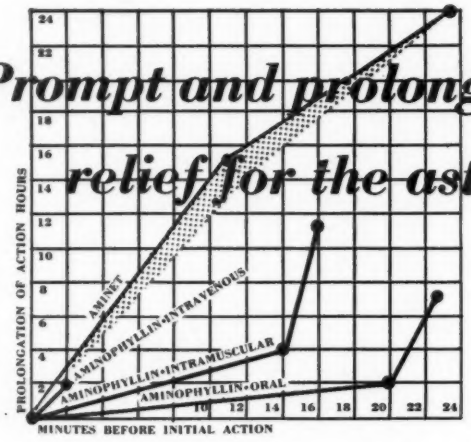
Sealed air-tight, then sterilized, Carnation Milk keeps absolutely safe in the unopened can. It can be taken on the longest journey, purchased in remotest regions, stored without refrigeration in any climate. For summer safety, *no* milk can be more conscientiously recommended. . . . *Carnation Company, Milwaukee, Wisconsin; Toronto, Ontario, Canada.*

Carnation

Milk

VITAMIN D INCREASED

"From Contented Cows"



Prompt and prolonged relief for the asthmatic

Readily available and easily administered even in the absence of a physician, AMINET *Suppositories* assure prompt relief. Relaxation of bronchial musculature—quickly achieved and effectively maintained—together with proper sedation prevents subsequent paroxysms.

AMINET *Suppositories*

Readily available and easily administered even in the absence of a physician, AMINET *Suppositories* assure prompt relief. Relaxation of bronchial musculature—quickly achieved and effectively maintained—together with proper sedation prevents subsequent paroxysms.

Bischoff

ERNST BISCHOFF COMPANY, INC. · IVORYTON, CONN.

Individualized Treatment
for the prophylaxis or therapeusis of
POLLEN ALLERGIES
★ Pitman-Moore pollen allergens are presented in specially designed individual treatment packages, which permit the dosage to be adjusted to individual sensitivity, a method definitely better than giving every patient the same dosage.
The permanency of these allergens is intensified by the use, in their production, of a special glycerosaline menstruum which insures full potency beyond the expiration date.
An Important Convenience Factor
When the case is of the typical seasonal type, with symptoms appearing annually shortly after the causative plants begin to bloom (grasses in the spring, ragweed in the fall) there is no necessity for making sensitization tests.
Pitman-Moore Allergenic Extract
GRASS POLLENS
(Mixed) (Bio. 102)
(With sterile diluent)
from the pollens of grasses responsible for most cases of the spring type of pollen allergy ("rose fever"): blue grass, timothy, sweet vernal, Johnson grass and red-top. (Each cc. of the concentrate contains 10,000 pollen units.)
ACCEPTED AMERICAN MEDICAL ASSN.
Pitman-Moore Allergenic Extract
RAGWEED POLLENS
(Mixed) (Bio. 101)
(With sterile diluent)
from pollens of Giant Ragweed 50% and Short Ragweed 50%. (Each cc. of the concentrate contains 10,000 pollen units.)
Write for
"A Simplification of the Physician's Problem in the Prevention and Treatment of Pollinosis."
PITMAN-MOORE COMPANY
PHARMACEUTICAL AND BIOLOGICAL CHEMISTS
Division of Allied Laboratories, Inc. · Indianapolis 6, Indiana

Extinguish the Pillars of Fire . .

Fed by psychosomatic "fuel" in the form of hypersecretion, vagus irritation and intestinal spasticity, many cases of hyperkinetic intestinal disease may often be effectively "quenched" by Lusyn — newly created in the research laboratories of The Maltbie Chemical Company to satisfy the most modern concepts of rational therapy in spastic gastro-enteropathies and hyperchlorhydria, with least disturbance of physiologic processes. • At once *antispasmodic* (by virtue of its homatropine methylbromide content) . . . *adsorbent* (through the alukalin component) . . . and *sedative* (because of the phenobarbital incorporated)—Lusyn brings prompt relief, yet is non-narcotic and will not produce secondary acid rebound. • *Indicated* in the treatment of pylorospasm—cardiospasm—unstable colon—biliary dyskinesia—biliary colic—and as an adjunct in the management of peptic ulcer. *Supplied* in bottles of 100 tablets each.

THE MALTBIE CHEMICAL COMPANY (Founded 1888) NEWARK, N. J.

LUSYN
TABLETS

S·I·M·I·L·A·C

Similar to human milk

★The name is never abbreviated; and the product is not like any other infant food — notwithstanding a confusing similarity of names.

The fat of Similac has a physical and chemical composition that permits a fat retention comparable to that of breast milk fat (Holt, Tidwell & Kirk, Acta Pediatrica, Vol. XVI, 1933) . . . In Similac the proteins are rendered soluble to a point approximating the soluble proteins in human milk . . . Similac, like breast milk, has a consistently ZERO curd tension . . . The salt balance of Similac is strikingly like that of human milk (C. W. Martin, M. D., New York State Journal of Medicine, Sept. 1, 1932). *No other substitute resembles breast milk in all of these respects.*

ACCEPTED COUNCIL ON FOODS AMERICAN MEDICAL ASSN.

A powdered, modified milk product especially prepared for infant feeding, made from tuberculin tested cow's milk (casein modified) from which part of the butter fat is removed and to which has been added lactose, olive oil, cocoanut oil, corn oil and fish liver oil concentrate.

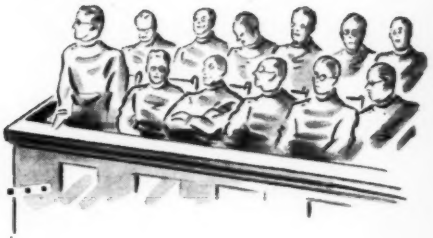
SIMILAC } SIMILAR TO HUMAN MILK

M&R DIETETIC LABORATORIES, INC. • COLUMBUS 16, OHIO

YOU

..ARE THE JUDGE..

AND JURY....



It is in the physician's office—at the patient's bedside—in the hospital—that the worth of pharmaceutical preparation is evaluated; that claims and promises are balanced against performance.

The many members of the medical profession—and they comprise a significant percentage of doctors in the United States—who have through the years used and prescribed U. S. Standard Products, have come to know and appreciate their unvarying dependability; their practical usefulness and economy; the conservatively fresh and unusual approach to therapeutic problems.

Avoiding exploitation of the merely "new" or "different," each research advance solidly buttressed by clinical or rational experimental evidence, U. S. Standard Products embody the best of the new and the traditional to provide the physician with the type of medication he has found effective in clinical practice.

OUTSTANDING U. S. STANDARD BIOLOGICALS:

Diphtheria Toxoid • Smallpox Vaccine

Tetanus Antitoxin • Typhoid Vaccine

Also a representative list of glandular products and pharmaceuticals.

U. S. STANDARD PRODUCTS CO.

WOODWORTH, WISCONSIN, U. S. A.

for the epileptic... **calm without the storm**

Tridione, Abbott's new synthetic drug, has been shown by clinical tests to be effective in the treatment of petit mal seizures in which other drugs have proved ineffective. ● In one series of tests[1] Tridione was given to a group of 50 patients subject to petit mal, myoclonic or akinetic seizures not helped by previous medication. In a period of days to weeks, these seizures ceased in 28 percent of the cases, were reduced to less than one-fourth of the usual number in 52 percent, and were little affected in 20 percent. In several patients the seizures once stopped *did not return* when medication was discontinued. Tridione also has had a beneficial effect in the control of psychomotor seizures in a certain proportion of cases.[2] ● Tridione is supplied in 0.3-Gm. capsules in bottles of 100. Literature on Tridione will be mailed on request. ABBOTT LABORATORIES, North Chicago, Illinois.

TRIDIONE

REG. U. S. PAT. OFF.

(3,5,5-trimethyloxazolidine-2,4-dione, Abbott)

(1) *Lennox, W. G.* (1945), *Petit Mal Epilepsies: Their Treatment With Tridione, J. Amer. Med. Assn., 129:1069, December 15.*
(2) *DeJong, R. N.* (1946), *Effect of Tridione in the Control of Psychomotor Attacks, J. Amer. Med. Assn., 130:565, March 2.*

Welcome Relief

in POISON IVY DERMATITIS

The tormenting itch of Rhus dermatitis has few equals in routine medical practice. Many patients receive early, welcome relief after injections of POISON IVY EXTRACT Arlington.

POISON IVY EXTRACT Arlington is an absolute alcohol extract of Rhus leaves of established potency. The use of absolute alcohol results in an extract of greater dependability. Use as supplied for diagnostic patch test and for treatment of poison ivy dermatitis.

Clinical evidence indicates that a single excitant is responsible for dermatitis due to poison ivy, poison oak, and poison sumac. Thus, this extract is equally applicable to dermatitis caused by contact with any of these plants.

DOSAGE: As soon as possible after appearance of symptoms, three subcutaneous injections of 0.1 cc. each are given at daily intervals.

POISON IVY EXTRACT

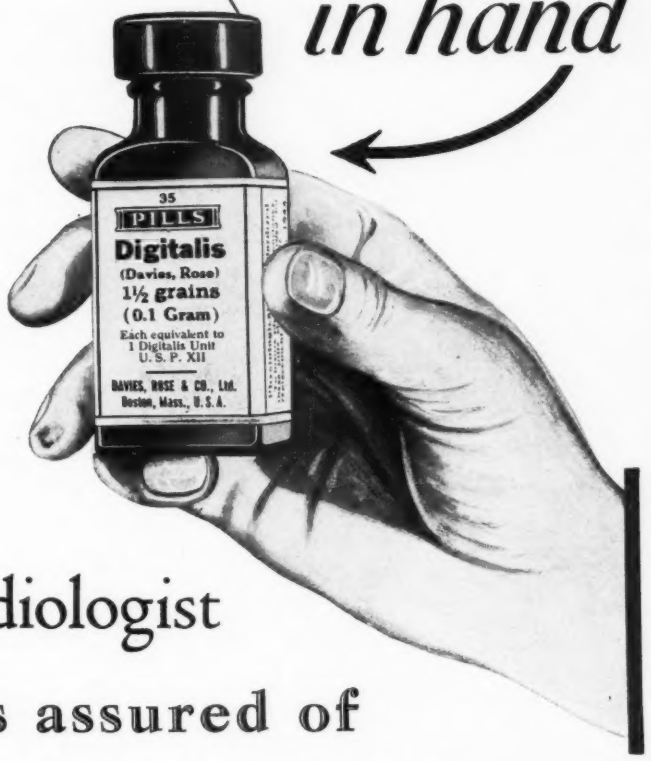
Arlington

SUPPLIED in rubber-stoppered vials containing 3 cc.

THE ARLINGTON CHEMICAL COMPANY

YONKERS 1 *Arlington* NEW YORK

With this in hand



The Cardiologist

is assured of

Dependability in Digitalis Administration

• • •

Being the powdered leaves made into
physiologically tested pills,
all that Digitalis can do, these pills will do.

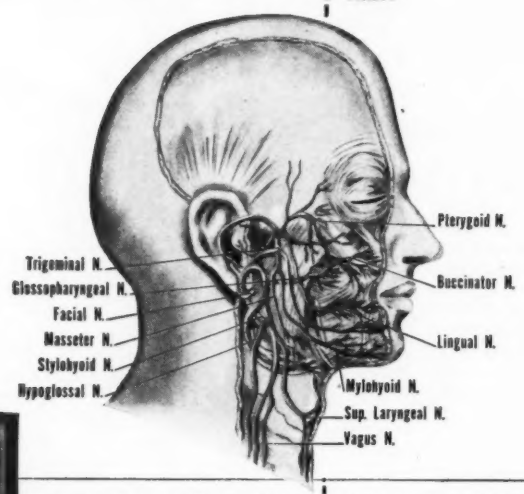
Trial package and literature sent to physicians on request.

DAVIES, ROSE & COMPANY, Limited

Manufacturing Chemists, Boston 18, Massachusetts

D14

EFFECTIVE ANALGESIA IN A HIGHLY INNERVATED AREA



The local pain and stiffness which follow a tonsillectomy are the result of injury to the fine network of sensory and motor nerves which honeycomb the area.

To effectively reach and relieve pain in this area, thousands of physicians are now prescribing Aspergum, because:

1. The patient thereby releases a soothing flow of saliva laden with acetylsalicylic acid that reaches and bathes *the recesses* of the pharyngeal mucosa and tonsillectomized fossae.
2. Traumatized tissues are kept moistened and less sensitive to pain.
3. Stimulation of muscle movement helps relieve local spasticity.
4. Earlier resumption of adequate diet is practicable.
5. The patient is more comfortable and convalescence is shortened.

The uniquely palatable form of Aspergum makes it especially useful in the treatment of children—and also adults who cannot or will not gargle.

Aspergum is available at prescription pharmacies in moisture-proof bottles of 36 tablets, packages of 16 and bottles of 250 tablets.

Ethically promoted—not advertised to the laity.

WHITE LABORATORIES, INC.
Pharmaceutical Manufacturers
NEWARK 7, N. J.

Dillard's
Aspergum

FOR POST-TONSILLECTOMY COMFORT

ILLUSTRATION BY HAROLD ANDERSON

Your ticket, Doctor

NO NEED for the doctor to be embarrassed over his failure to remember his ticket. Every minute is measured these days, and during the last hour at the office there were many things to be done. Despite the temporary hardship which his absence will impose on his patients, the few days required to attend the state medical meeting, where opinions can be exchanged with mutual respect and confidence, will be time well spent.

The tempo of medical progress, always rapid, has been accelerated to a marked degree during the last few years. New discoveries and developments have been most revealing. In the practice of medicine, the old is never good enough if the new is better. Medical meetings are essential to better understanding, better health, and better medical care. The physician owes it to himself and to his patients to attend whenever possible.

A picture of The Good Samaritan provided the inspiration that

eventually led to the founding of Eli Lilly and Company

Iletin (Insulin, Lilly)

PROTAMINE, ZINC & ILETIN (INSULIN, LILLY)
PROTAMINE ZINC INSULIN LILLY
ILETIN INSULIN, LILLY
20 Units per cc.
ILETIN INSULIN, LILLY
Made from Zinc-Insulin Crystals
20 Units per cc.
ILETIN INSULIN, LILLY
80 Units per cc.
ELI LILLY AND COMPANY INDIANAPOLIS, U. S. A.
40 Units per cc.
ELI LILLY AND COMPANY INDIANAPOLIS, U. S. A.

YEARS of research and experience in the manufacture of large lots of Iletin (Insulin, Lilly) have resulted in the development of methods of preparation and standardization that insure purity, stability, and constant unitage. Iletin (Insulin, Lilly) and its modifications are supplied in 10-cc. vials designated as:

Iletin (Insulin, Lilly), U-20, U-40, U-80, and U-100, containing 20, 40, 80, and 100 units per cc., respectively.

Iletin (Insulin, Lilly) made from zinc-Insulin crystals, U-20, U-40, and U-80, containing 20, 40, and 80 units per cc., respectively.

Protamine, Zinc & Iletin (Insulin, Lilly), containing 400 and 800 units, labeled 40 and 80 units per cc., respectively.

ELI LILLY AND COMPANY
INDIANAPOLIS 6, INDIANA, U.S.A.

new, nontoxic, **smaller dosage** sulfonamide

'SULFATHALIDINE'

Phthalylsulfathiazole

for **treatment of colon infections**

RESULTS OBTAINED WITH 'SULFATHALIDINE' PHTHALYLSULFATHIAZOLE*

DISEASE	GOOD 84%	FAIR 6%	POOR 10%
Chronic Ulcerative Colitis	20 acute 54 chronic	1 acute 1 chronic	1 acute 3 chronic
Bacillary Dysentery		2 chronic	
Giardia Lamblia	2 acute 6 chronic		
Paratyphoid		2 chronic	
Dientameba Fragilis	2 acute		
Amebic Colitis			4 acute 2 chronic
Total Number of Patients: 100	24 acute 60 chronic	1 acute 5 chronic	5 acute 5 chronic

Smaller dosage, nontoxicity, effective bacteriostasis are outstanding therapeutic features of 'Sulfathalidine' *phthalylsulfathiazole*, the new enteric sulfonamide developed by the Medical Research Division of Sharp & Dohme.

The new compound is indicated in the treatment of ulcerative colitis, regional ileitis, as a supplement to therapy of amebiasis, giardiasis, and paratyphoid infections, and as an adjunct to intestinal surgery.

'Sulfathalidine' *phthalylsulfathiazole* maintains a high bacteriostatic concentration in the gastrointestinal tract, profoundly reducing Escherichia coli, clostridia and related organisms. Only 5% of the ingested drug is absorbed and this is rapidly excreted by the kidneys.

Administered recently to 100 patients with colon infections, 'Sulfathalidine' *phthalylsulfathiazole* was effective in the treatment of 90.* The clinician reported:

*"It is my impression that phthalylsulfathiazole is less toxic and more bacteriostatic than any intestinal agent used previously and that, because it has these properties, smaller doses of the drug may be used to advantage."**

'Sulfathalidine' *phthalylsulfathiazole* is supplied in 0.5-Gm. compressed tablets in bottles of 100, 500, and 1,000. Sharp & Dohme, Philadelphia 1, Pa.

*J.A.M.A., *129*: 1080, Dec. 15, 1945

SHARP & DOHME

. . . the characteristic response

THE prompt symptomatic relief provided by Pyridium is extremely gratifying to the patient suffering with distressing urinary symptoms such as painful, urgent, and frequent urination, tenesmus, and irritation of the urogenital mucosa.

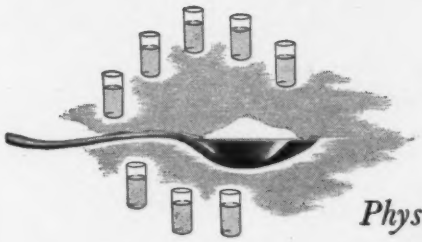
Pyridium is convenient to administer, and may be used with complete safety throughout the course of cystitis, pyelonephritis, prostatitis, and urethritis. *The average oral dose is 2 tablets t.i.d.*

PYRIDIUM
REG. U.S. PAT. OFF.
(Phenylazo-alpha-alpha-diamino-pyridine mono-hydrochloride)

For gratifying relief of distressing symptoms in urogenital infections.

Pyridium is the United States Registered Trade-Mark of the Product Manufactured by the Pyridium Corporation.

MERCK & CO., Inc. *Manufacturing Chemists* RAHWAY, N. J.



Physiologic Re-education
To Break a Laxative Habit

Mucilose—highly concentrated psyllium hemicellulose—provides bland, lubricating bulk . . . stimulates peristalsis physiologically . . . promotes normal habits. The greater effectiveness of smaller doses encourages patients to *stay with* the Mucilose bulk laxative regime.

Mucilose

For Intestinal Bulk and Lubrication

MUCILOSE absorbs nearly 50 times its weight of water to form bland lubricating bulk which gently stimulates peristalsis. Hypo-allergenic, free from irritants, non-digestible, non-absorbable.

INDICATED in spastic and atonic constipation, and as a dietary adjunct for the control of constipation in aged, convalescent and pregnant patients.

DOSAGE: 1 or 2 teaspoonfuls in a glass of any fluid once or twice daily, or may be placed on the tongue and washed down, or eaten with cereals or other foods.

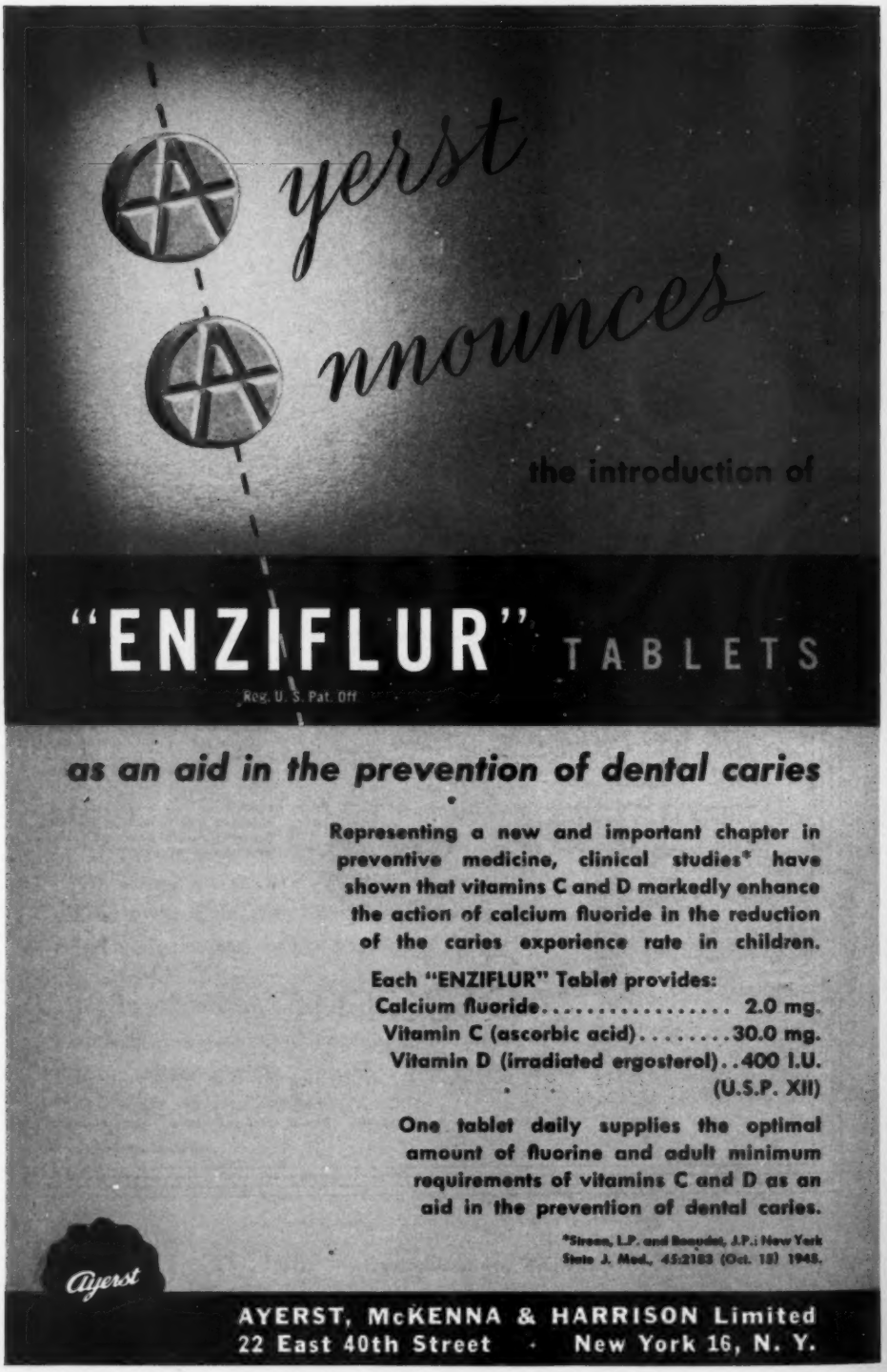
SUPPLIED in 4 oz. bottles and 16 oz. containers. Also available as Mucilose Granules—a dosage form preferred by some patients.

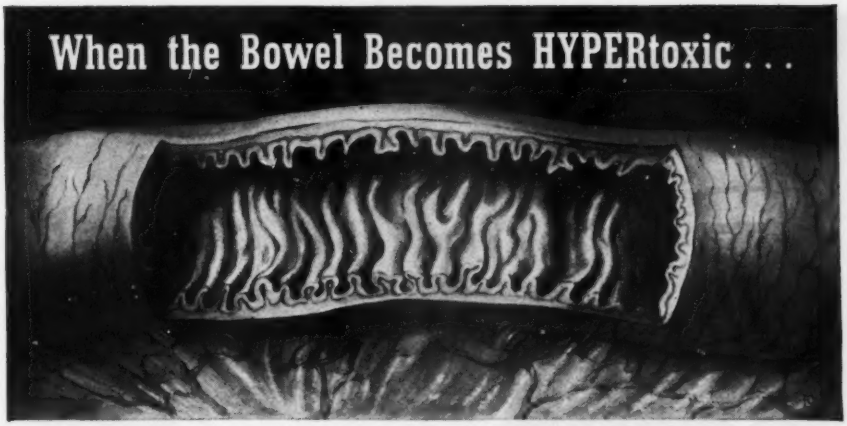
Frederick Stearns & Company
Division

DETROIT 31, MICHIGAN

NEW YORK KANSAS CITY SAN FRANCISCO WINDSOR, ONTARIO SYDNEY, AUSTRALIA AUCKLAND, NEW ZEALAND

Trade-Mark Mucilose Reg. U. S. Pat. Off.


yerst announces
the introduction of
"ENZIFLUR" TABLETS
Reg. U. S. Pat. Off.
as an aid in the prevention of dental caries
Representing a new and important chapter in preventive medicine, clinical studies* have shown that vitamins C and D markedly enhance the action of calcium fluoride in the reduction of the caries experience rate in children.
Each "ENZIFLUR" Tablet provides:
Calcium fluoride..... 2.0 mg.
Vitamin C (ascorbic acid).....30.0 mg.
Vitamin D (irradiated ergosterol)..400 I.U.
(U.S.P. XII)
One tablet daily supplies the optimal amount of fluorine and adult minimum requirements of vitamins C and D as an aid in the prevention of dental caries.
*Strean, L.P. and Beaudet, J.P.: New York State J. Med., 45:2183 (Oct. 15) 1945.
Ayerst
AYERST, McKENNA & HARRISON Limited
22 East 40th Street · New York 16, N. Y.



SORICIN IS EFFECTIVE IN 80+% OF CASES

Toxic substances produced in the bowel by bacterial proliferation and abnormal protein digestion, normally are detoxified by the liver. However, when formed in excess, they succeed in passing the liver barrier, thus entering the general circulation.

Soricin, by detoxifying bacterial toxins and other toxic substances in the bowel, acts *at the source* to lighten the load placed upon the body's natural defense mechanism. Available statistics, covering a total of 17,862 patients, demonstrate clinical improvement with Soricin therapy in 80% to 90% of cases treated.

When such conditions as mucous colitis, intestinal toxemia, "constipation headaches," functional diarrhea, toxic vertigo and gastrointestinal allergy suggest the bowel as a focal source of toxins, detoxify with

SORICIN

Brand of Sodium Ricinoleate

Soricin Tablets, Soricin with Bile Salts Tablets, and Soricin with Bile Salts and Pancreatin Tablets are available at prescription pharmacies in bottles of 100 and 1000.

Write for complete literature

Trademark "Soricin" Reg. U. S. Pat. Off.

MERRELL
Since 1828

THE WM. S. MERRELL COMPANY CINCINNATI, U. S. A.

it all boils down
to
this

Concentrated from 27 grams of three of the richest natural sources—yeast, liver and rice polishings—a single teaspoonful of Elixir 'OMNI-BETA'* contains:

Thiamine HCl . . . 1.5 mg. . . . equal to 25 tablets of brewers' yeast

Riboflavin . . . . . 2.0 mg. . . . equal to 100 tablets of brewers' yeast

Niacinamide . . . 10.0 mg. . . . equal to 66 tablets of brewers' yeast

plus | Pantothenic acid . . . . . 1.4 mg.
plus | Pyridoxine HCl . . . . . 0.4 mg.

and *all* the unidentified factors of the B complex as well.

Here is a palatable and simple way to assure the minimum adult daily requirements of all the essential B vitamins, in addition to large amounts of the complete B complex.

No colossal capsules. No staggering stacks of tablets. Just a single teaspoonful of Elixir 'Omni-Beta'.

For additional pharmaceutical details consult your pharmacist—for more extensive medical data write Medical Division.

William R. WARNER and Co. Inc. 113 WEST 18TH STREET, NEW YORK 11, N. Y.

elixir

'omni-beta'

vitamin B complex

Supplied in cartoned, light-proof bottles of 4 and 8 fluidounces. Each carton includes a plastic, standardized U.S.P. teaspoon measure.

*Trademark Reg. U.S. Pat. Off.

Freed—

FROM THE BONDS OF THE MENOPAUSE

HOT FLASHES . . .
DIZZINESS . . .
HEADACHES . . .
EMOTIONAL DISTURBANCES
. . . SLEEPLESSNESS . . .

SYMPTOM CONTROL with Conestron is often a valuable aid to a smoother, more rapid adjustment to the natural internal changes which occur during the climacteric.

RELATIVELY NONTOXIC, Conestron brings about a striking improvement in the patient's sense of well-being without the distressing side effects which may be associated with synthetic preparations.

HIGHLY POTENT ORALLY ACTIVE WELL TOLERATED

TABLETS

CONESTRON

TRADE-MARK

Natural Conjugated Estrogens (equine)

Each tablet contains 0.625 mg. estrogens as sodium estrone sulfate • *Supplied in bottles of 100 and 1000*

Wyeth

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DARTHRONOL

IN THE *Systemic*

REHABILITATION OF
CHRONIC ARTHRITICS

That chronic arthritis is a systemic disease, of which the joint lesions are only one manifestation...

DARTHRONOL
TRADE MARK
EACH CAPSULE CONTAINS:
Vitamin D ..... (Irradiated Ergosterol) ..... 50,000 USP units
Vitamin A ..... (Fish-Liver Oil) ..... 5,000 USP units
Vitamin C ..... (Ascorbic Acid) ..... 75 mg.
Vitamin B1 ..... (Thiamine Hydrochloride) ..... 3 mg.
Vitamin B2 ..... (Riboflavin) ..... 2 mg.
Vitamin B6 ..... (Pyridoxine Hydrochloride) ..... 0.3 mg.
Niacinamide ..... 15 mg.
Calcium Pantothenate ..... 1 mg.
Mixed Natural Tocopherols ..... 3.4 mg.
(Equivalent in biological activity to 3 mg. of alpha tocopherol)
With excipients and fillers in an artificially colored gelatin capsule

. . . is revealed by the frequent concurrence of many symptoms referable to systemic disturbances: loss of weight, anemia, neuritis, senile metabolic changes, gastro-intestinal affections, impairment of liver function, increased sedimentation rate, impaired carbohydrate metabolism, and early development of arteriosclerosis.

For the effective treatment of a systemic disease as complex as arthritis it is necessary to institute a complete program of systemic rehabilitation. Such a program must include optimal nutrition, physical and mental rest, supervised exercise, physical therapy, orthopedic measures, and all the essential vitamins in amounts sufficient to exert both nutritional and pharmacodynamic influences.

Darthronol merits inclusion in such a program of systemic rehabilitation. It supplies in a single capsule massive dosage of vitamin D in addition to adequate doses of the eight other essential vitamins. The need for greatly increased amounts of all the essential vitamins has been repeatedly demonstrated in arthritic patients.

Extensive bibliography on the role of these vitamins in the management of arthritics and the comprehensive brochure "Systemic Therapy in the Arthritides" will be sent on request.

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Undescended testes are exposed to several hazards —atrophy, sterility, torsion and malignant degeneration. Even if these unfortunate complications do not eventuate, the very existence of cryptorchidism may be responsible for or contribute toward psychic disturbances in adolescence.

PRANTURON

Administration of PRANTURON, chorionic gonadotrophin, at an early age often causes the cryptorchid organ to assume its natural position and thereby promotes somatic and emotional readjustment.

PRANTURON is available in two strengths as a stable powder in multiple dose vials to permit flexibility in dosage, each vial containing 5,000 I.U. or 10,000 I.U. of dry, highly purified hormone of pregnancy urine. When diluted with the sterile diluent provided, solutions of 500 I.U. per cc. or 1,000 I.U. per cc. are obtained. Packaged in boxes of one vial.

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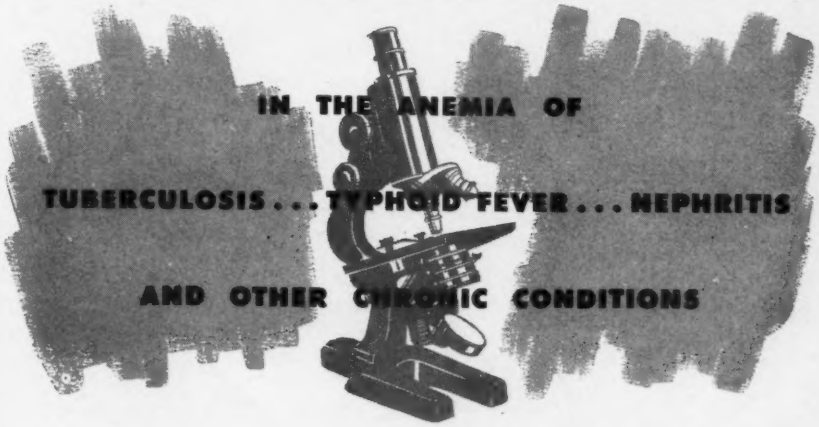

HEPATINIC

Two factors function in chronic infections to produce the usually concomitant hypochromic anemia—

(a) increased destruction or increased utilization of red cells due to the infection;

(b) impaired intake or utilization of diet.

Consequently one phase of medical management of chronic infections includes eradication of the coexisting anemia. Hepatinic presents iron in preferred form, together with crude (unfractionated) liver concentrate, enhanced by the addition of the B complex. The crude (unfractionated) liver concentrate is subjected in manufacture to a special process of "enzymatic digestion", assuring maximum assimilation.

Taste Appeal!

Taste is important in hemopoietic tonics. Hepatinic—pleasantly palatable—is readily accepted even by finicky, taste-conscious patients. Samples will be sent to physicians on request.

FORMULA:

Each fluidounce contains: Ferrous Sulfate 12 gr., Crude Liver Concentrate (equivalent to 660 gr. fresh liver) 60 gr., fortified to represent Thiamine Hydrochloride 2 mg., Riboflavin 4 mg., Niacinamide 20 mg., together with pyridoxine, pantothenic acid, choline, folic acid, vitamin B_{10}, vitamin B_{11}, biotin, inositol, para-amino-benzoic acid and other factors of the vitamin B complex.

Elixir Hepatinic is supplied in bottles of one pint and one gallon

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VAGINAL JELLY
A NEW CONVENIENCE FOR THE PHYSICIAN
ORTHO CONTRACEPTIVES IN COMPLETE SETS
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Provides for mechanical exclusion of air at site of burn • Insures prompt relief of pain • Aids in abating burn shock • Bacteriostatic influence • Non-toxic effect • STIMULATES TISSUE REPAIR • Rapidly reduces inflammation and edema • Results in absence or marked reduction of scar tissue • Tends to shorten convalescent period.

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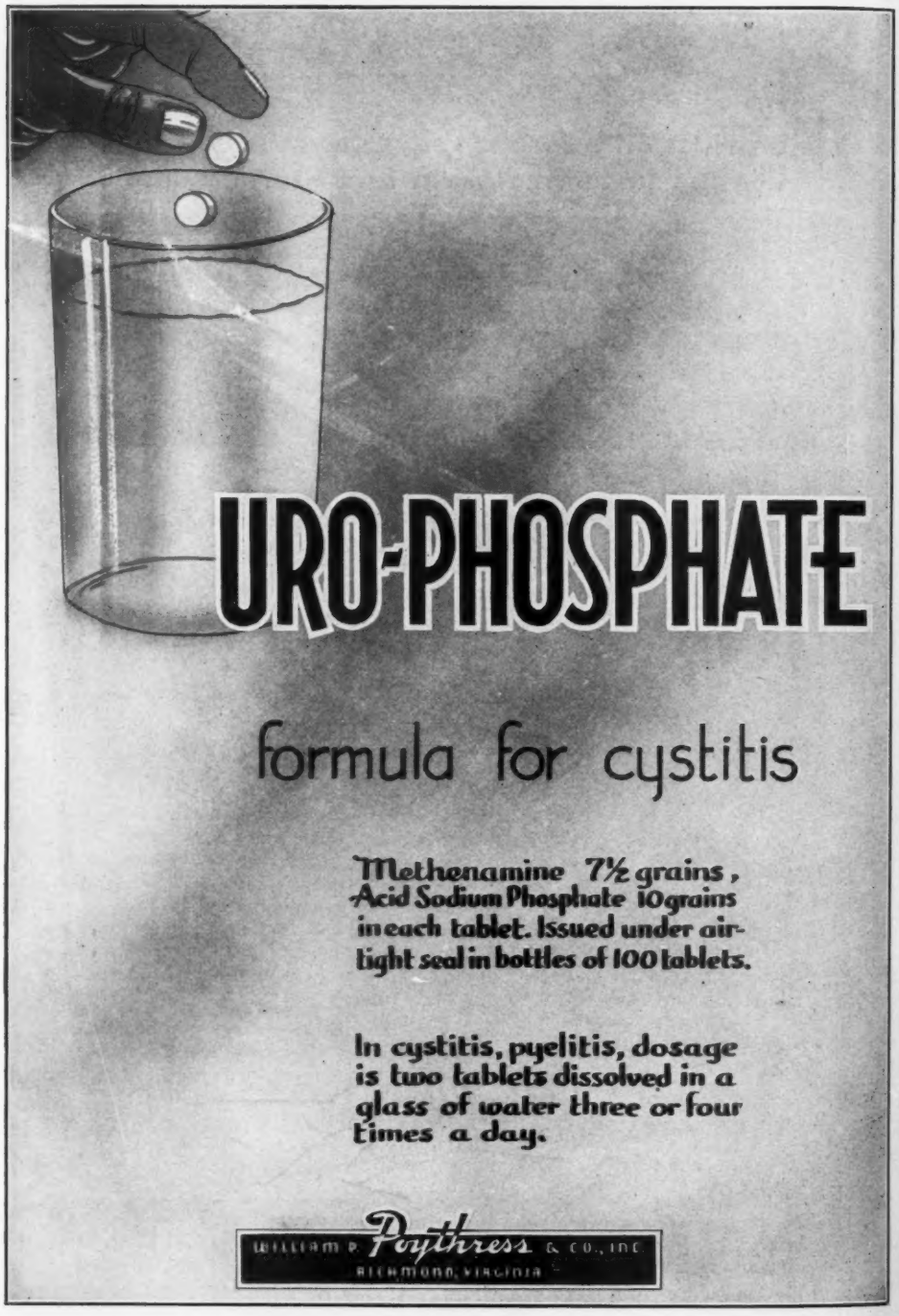
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To physicians with the task of managing biliary tract disease, Breon research chemists present Doxychol-K.

It washes the entire biliary tree (through the good offices of the liver) by bile that flows free. More, Doxychol-K furthers good nutrition by changing inactive pancreatic ferment to an active fat-splitting form.

The 100-200% increase in thin bile is due to the pure, oxidized cholic acid derivatives in Doxychol-K. Fat digestion is initiated by the pure desoxycholic acid which forms water-*soluble*, loose molecular complexes that carry water-*insoluble* substances through the intestinal walls.

Biliary stasis and defective fat digestion only summarize the field of use for Doxychol-K.

Each tablet contains: Desoxycholic Acid 65 mg.
Ketocholanic Acids derived from oxidized pure cholic acid, providing approx. 90% dehydrocholic acid . . . . . 200 mg.

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VI-LITRON Capsules supply:

Special Liver Fraction*
—a high concentration (55 to 1) of the anti-secondary anemia principle.

Iron as Ferrous Sulfate
—the form considered to be most readily assimilated and utilized.

Vitamins B_1 • B_2 • Niacinamide
—deficiency of these vitamins often interferes with maximum absorption of RBC factors.

Vitamin C
—said to be "involved in normal erythropoiesis"; even mild deficiency may cause hypochromic anemia.

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—gastric hydrogen ion concentration known to be favorable to iron absorption.

*Not a pernicious anemia product

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for Secondary ANEMIA

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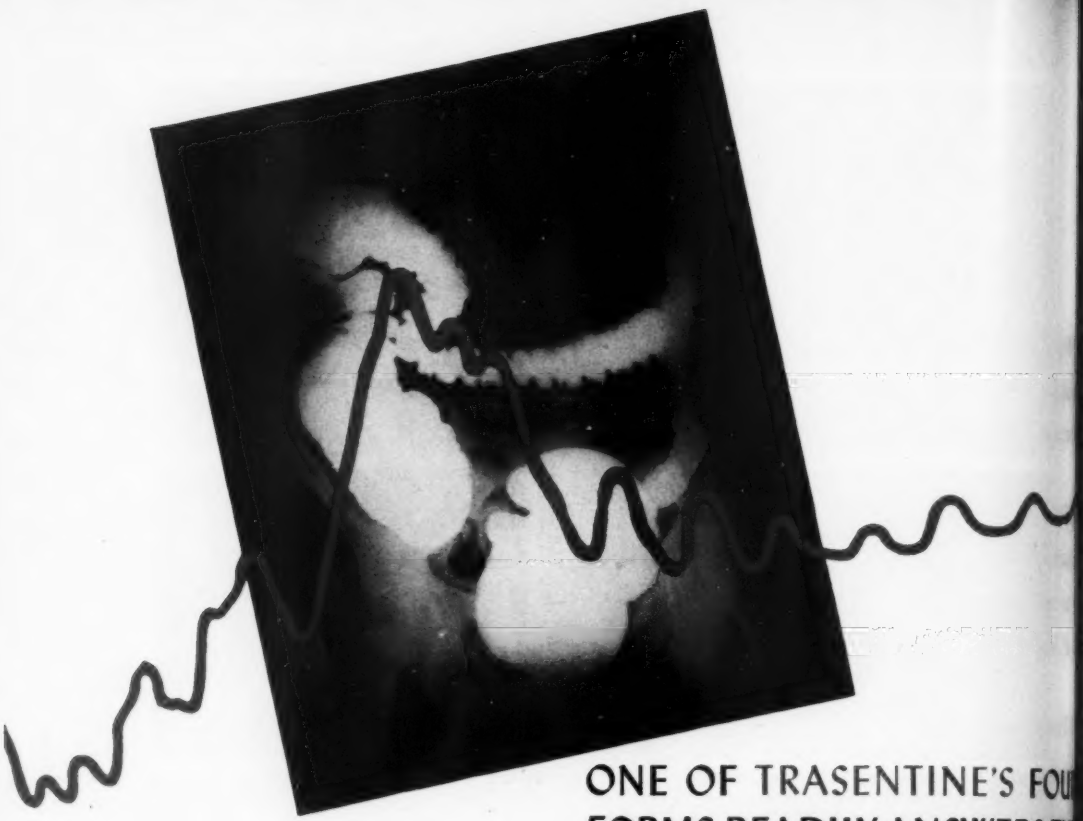
IN RELIEF OF SPASTIC PAIN



ONE OF TRASENTINE'S FOU FORMS READILY ANSWERS TH PROBLEM OF SPASTICIT

When oral medication is the choice	➧ TRASENTINE TABLETS!
Is more immediate control of spasm necessary?	➧ TRASENTINE AMPULS FOR INJECTION!
Do you need control of spasm plus sedation?	➧ TRASENTINE-PHENOBARBITAL!
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Do nausea and vomiting prevent use of oral medication?	➧ TRASENTINE RECTAL SUPPOSITORIES!

Trasentine possesses the spasmolytic action of papaverine and atropine, without the undesirable side effects of the latter on the heart, pupil, accommodation and salivary glands.

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MORE SELECTIVE MEDICAL MANAGEMENT

with

TRASENTINE AND TRASENTINE-PHENOBARBITAL

Pain and discomfort due to spasm are encountered in patients of many types and ages, and are frequently accompanied by other complicating conditions. Obviously, one form of antispasmodic cannot be used with success for all.

This is a leading reason why many physicians are prescribing Trasentine, in the administration form best suited to individual requirements. Ciba offers Trasentine in not one, but *four* forms. One or more of these medications will provide the route of choice and the necessary individualized control.

Trasentine, a non-narcotic antispasmodic of low toxicity, quickly and effectively relieves pain due to smooth muscle spasm. Trasentine-Phenobarbital adds central nervous system sedation to the spasmolytic action of Trasentine.

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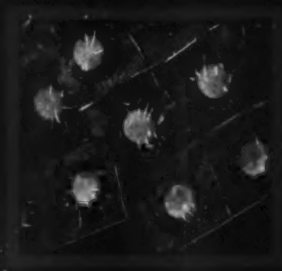
STOMACH and INTESTINE	UTERUS	GENITO-URINARY SYSTEM
Cardiospasm	Dysmenorrhea due to myometrial hypertonicity or excessive uterine contractions.	Urinary bladder spasm
Gastric hypermotility		Neurogenic disease of bladder
Pylorospasm		Ureteral colic
Spasticity of colon and duodenum involving sphincter of Oddi, biliary colic, peptic ulcer		To facilitate examinations, etc.

TRASENTINE

Trasentine Tablets—the most widely used form of Trasentine for effective control of smooth muscle spasm.

ISSUED: Tablets each containing 75 mg. Trasentine. Available at your pharmacy in bottles of 20 and 50.



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Trasentine-Phenobarbital—for use where sedation of the central nervous system is an additional requirement.

ISSUED: Tablets each containing 20 mg. of Trasentine and 20 mg. of Phenobarbital, in boxes of 40 and 100.

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Trasentine Ampuls—for prompt clinical results. May be followed by other forms after control is established.

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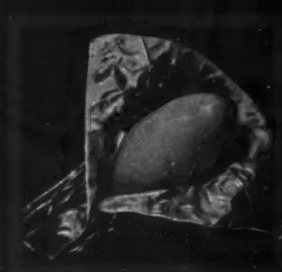

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Trasentine Rectal Suppositories—prescribed especially in spastic dysmenorrhea, and in cases where nausea and vomiting preclude the use of oral medication.

ISSUED: Suppositories containing 100 mg., cartons of 5.

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Vitamins A and the whole of B supply, each, their independent, needed growth factors.

The pioneers used Dried Brewers Yeast in finding and showing the independent Vitamin B growth need for both animals and children.

Hess, Bloxson and others used it to aid in the growth of incubator babies; found it easily borne.

At approximately four to five grams to a teaspoon, one-quarter for bottle formulas, one-half to one for older children, are indicated.

Add to milk, cereals, soups, vegetables.

Vitamin Food Company's Red Label (Debittered), Green Label (Undebittered, mostly used in pellagra) or Autolex (enzyme digested), brands of Dried Brewers Yeast supply the needed whole of Natural Vitamin B in pure and potent form.

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—Gunther, L.: West. J. Surg., 48:304-309 (May) 1940

"calcium balance... vitally necessary"

—Effective Calcium Concentration—

Calcium Gluconate Effervescent (Flint) is a pleasant means of prescribing calcium reinforcement—particularly when administration is prolonged. Every clinician appreciates the need for increasing calcium consumption by the pregnant and lactating mother to maintain the calcium level in the maternal organism as well as to supply the essential needs of the developing fetus.

Each gram of Calcium Gluconate Effervescent (Flint) contains calcium gluconate U.S.P. 0.5 Gm., citric acid 0.25 Gm., sodium bicarbonate 0.25 Gm. The average dose is 1 to 1½ teaspoonfuls. It contains 48 to 52% calcium gluconate.

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Working under an independent grant, Smith and Livingston[1] studied a series of 1372 experimentally induced wounds and burns in animals treated by the water-soluble derivatives of chlorophyll "a" ($C_{55}H_{72}O_5N_4Mg$) and by many of the standard preparations in clinical use today. In their conclusions they state: "*Of these agents only the chlorophyll preparations consistently showed any statistically significant effect in accelerating the healing of both traumatic and thermal wounds.*"

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During the past four years, numerous investigators have tested the water-soluble derivatives of chlorophyll in laboratory and clinic in the topical treatment of wounds, battle injuries, burns, ulcers and similar lesions, especially those of the chronic, indolent and resistant type. They have demonstrated that these natural, nontoxic chlorophyll preparations produce a definite, measurable acceleration of healing and reduction of scar tissue. In addition, they report prompt elimination of the almost unbearable odors found regularly in chronic suppurative lesions of bone and other tissues.

NOW GENERALLY AVAILABLE

After exhaustive clinical investigation, these therapeutic chlorophyll preparations are now offered to the medical profession by the Rystan Company under the name *Chloresium*.

The topical use of Chloresium Solution (Plain) and Chloresium Ointment is indicated in a wide range of acute and chronic lesions, especially in the treatment of wounds, burns, ulcers, skin diseases, and malodorous lesions.

1Smith, L.W. and Livingston, A. E. —"Chlorophyll: An experimental study of its water-soluble derivatives in wound healing," AMER. J. SURG. New Series LXII:358 (1943)

Chloresium is ethically promoted. Available at all leading druggists.

Chloresium Solution (Plain).....2 oz. and 8 oz. bottles
Chloresium Ointment.....1 oz. tubes and 4 oz. jars
Chloresium Nasal Solution.....½ oz. dropper bottles and 2 oz. and 8 oz. bottles

Both Chloresium Solution (Plain) and Chloresium Ointment contain the purified, therapeutically active water-soluble derivatives of Chlorophyll "a" ($C_{55}H_{72}O_5N_4Mg$). They are maintained to rigid chemical and physical standards and are pharmaceutically adjusted to a low surface tension to insure penetrability.

Chloresium Nasal Solution contains the purified, therapeutically active water-soluble derivatives of chlorophyll "a" ($C_{55}H_{72}O_5N_4Mg$) in an isotonic saline solution suitably buffered for nasal instillation. Indicated for symptomatic relief and for acceleration of healing of acute and chronic inflammatory conditions of the upper respiratory tract.

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. . . A review of over 60 published papers. Explicit directions for the use of Chloresium therapy in everyday practice. This comprehensive brochure, as well as supplies for clinical trial, will be forwarded without obligation, upon request. Please address Dept. SM-2

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"Preliminary study of the effects of routine post-operative use of sulfathiazole gum indicated a reduction in the incidence of secondary hemorrhage."†

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...provides HIGH salivary concentration with LOW (negligible) systemic absorption

INDICATIONS: Local treatment of sulfonamide-susceptible infections of oropharyngeal areas; acute tonsillitis and pharyngitis—septic sore throat—infectious gingivitis and stomatitis—Vincent's infection. Also indicated in the prevention of local infection secondary to oral and pharyngeal surgery.

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Available in packages of 24 tablets, sanitaped, in slip-sleeve prescription boxes.

IMPORTANT: Please note that your patient requires your prescription to obtain this product from the pharmacist.

†*McGovern, F. H.: Prevention of Secondary Post-Tonsillectomy Hemorrhage with Sulfathiazole Gum, Arch. Otolaryn.: 40:196-197 (Sept.) 1944.*

"when the gum was chewed for one-half to one hour, the average salivary concentration of sulfathiazole was 70 mg. per hundred cubic centimeters. The blood sulfathiazole of children chewing 1 tablet for one-half hour for twelve daily doses showed a maximal concentration of 0.5 mg. per hundred cubic centimeters."†

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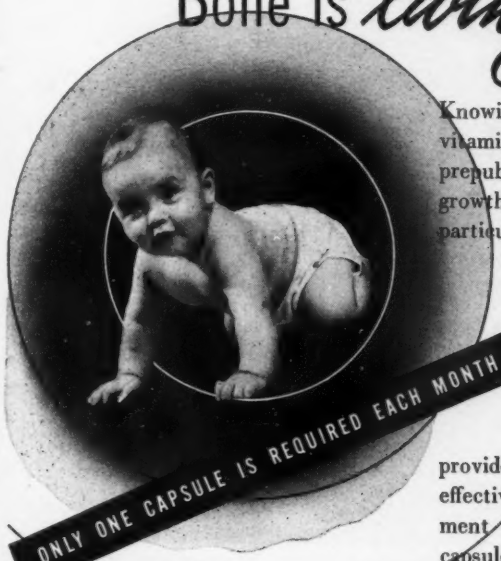
Bone is *living* tissue...



Knowing this, the physician prescribes vitamin D during infancy, childhood and prepuberty—periods of active skeletal growth when antirachitic measures are particularly indicated.

Infron *Pediatric*

provides a convenient, new method of effective rickets prophylaxis and treatment with appreciable economy. Each capsule contains 100,000 U.S.P. units of vitamin D—Whittier Process—especially prepared for pediatric use.

The therapeutic effectiveness and nontoxicity of Infron Pediatric is based on extensive clinical investigations.*

Readily miscible in the feeding formula, milk, fruit juice or water—can also be spread on cereal.

Supplied in packages of 6 capsules each—sufficient dosage for 6 months. Available at prescription pharmacies.

*REFERENCES

Rambar, A. C., Hardy, L. M. and Fishbein, W. I.: J. Ped. 23:31-38 (July) 1943
Wolf, I. J.: J. Ped., 22:707-718 (June) 1943
Wolf, I. J.: J. Ped., 22:396-417 (April) 1943
Wolf, I. J.: J. Med. Soc. New Jersey, 38:436 (Sept.) 1941

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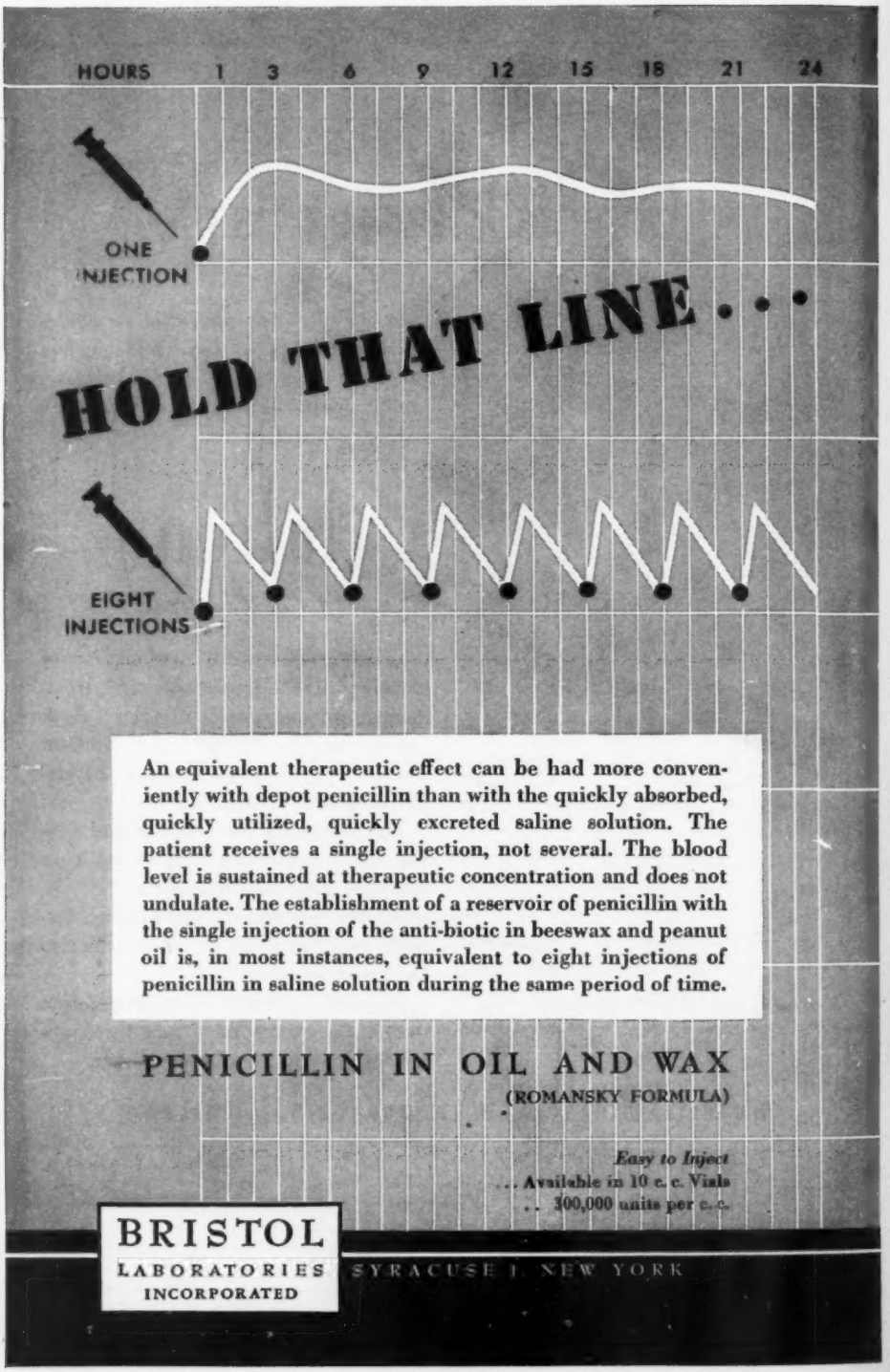

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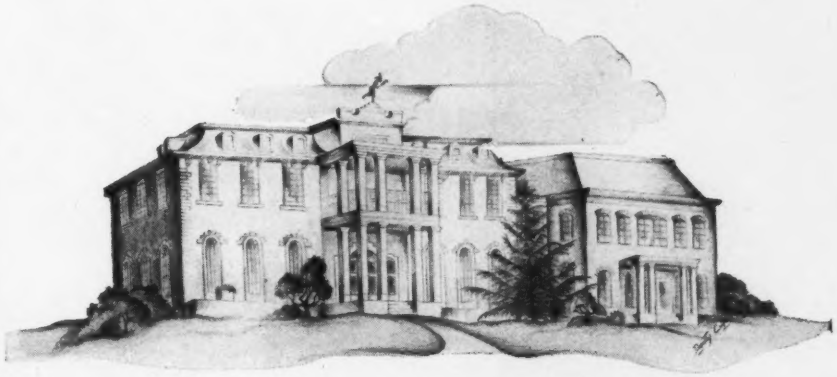

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NERVOUS AND MENTAL DISEASES
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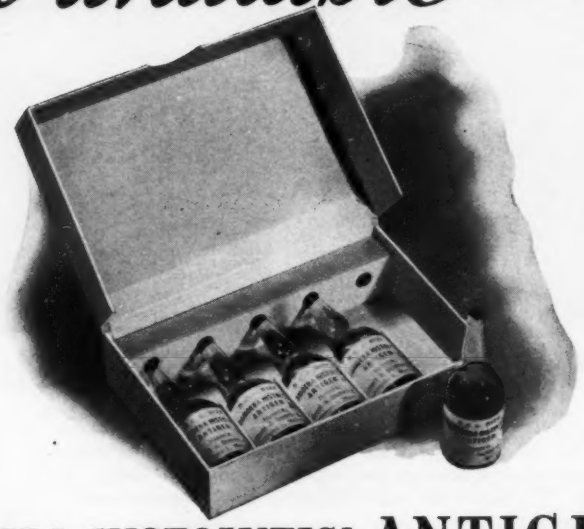

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* *American Journal of Tropical Medicine, Vol. 22, No. 6, November, 1942, page 581.*

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CARCINOMA OF THE FUNDUS UTERI*

By ROBERT J. CROSSEN, M.D.
St. Louis, Missouri

In the time allotted I should like to discuss advances in our knowledge of the etiology, diagnosis, classification, treatment and prevention of carcinoma of the endometrium.

First in regard to etiology. It has long been recognized that age plays an important role in endometrial carcinoma. It is seldom seen before forty-five and is most common in the fifth decade of life. Childbearing, a significant factor in cervical carcinoma, is not important in fundal carcinoma, as the latter is just as frequent in nulliparous as it is in parous women.

Since the discovery of the ovarian hormones, knowledge of their action on the endometrium has been clarified largely through work on experimental animals, and, in castrated women in whom the uterus was not removed. By using the ovarian hormones in their proper sequence one is able to cause the same changes in the endometrium of these castrates as occur with the normal endometrial cycle. Hartman[1] and others have been able to produce hyperplasia of the endometrium in castrated animals by prolonged administration of estrogenic hormones. Hoffman produced the same condition in castrated women. Though there is still no unanimity of opinion, many workers now feel that hyperplasia may be a predisposing factor in the development of endometrial carcinoma. In checking back on fundal carcinoma patients who have had previous curettements, many were found to have had a hyperplasia prior to the development of the carcinoma. If the portions of the uterus not occupied by the carcinoma are checked, the endometrium is found to show a hyperplasia in many. In the literature of the past ten years, numerous cases of fundal carcinoma associated with granulosa cell tumors of the ovary have been reported, and it has been suggested that this prolonged and excessive stimulation of the endometrium by this abnormal source of endogenous estrogen, was an important etiologic factor in the development of the endometrial carcinoma.

With all this circumstantial evidence pointing to the prolonged continuous action of estrogen as a factor in the causation of endometrial carcinoma, Dr. Hobbs and I[2] in 1935, analyzed a group of fundal carcinoma cases to determine whether delayed menopause, with its prolonged estrogenic activity, was more common in these carcinoma cases than it was in a series of normal cases. We found that 60 per cent of the carcinoma cases menstruated past 50 years in contrast to 15 per cent of the normal cases. These normal cases reported were not followed after the series was reported so we do not know how many of these so-called normal cases developed carcinoma later in life. In the menopausal ovary one finds persistent follicles with no corpora lutea. Though these follicles, when analyzed, show very little estrogen, according to Hartman, they deliver a great deal over a twenty-four hour period. The absence of the corpora lutea, with its inhibiting effect on the carcinogenic action of estrogens, also probably is a factor in the late menopause cases.

In order to determine the importance of age as a factor, in 1944, in collaboration with Dr. Leo Loeb, I[3] reported upon the effects of long continued estrogenic administration upon the sex organs in menopausal mice. In all of the reports prior to this, young animals had been used. To

*Read in Section on Gynecology, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.

my knowledge there have been no cases of endometrial carcinoma occurring spontaneously in mice nor have there been any reported in mice produced by carcinogenic substances. Time does not permit a complete summary of our results but I wish to show the results in the mouse showing the most marked endometrial changes. The changes were more marked than any obtained in the previous very extensive work in young mice done by Dr. Loeb. Whether the changes seen here in *Figs. 1* and *2* would have progressed to extensive endometrial carcinoma, or regressed after cessation of the estrogenic administration is impossible to surmise. A more extensive series is necessary for definite conclusions but these results to date suggest that age is an important factor in the development of this abnormal endometrial stimulation.

In summarizing then we can say that the specific cause of endometrial carcinoma is not known but circumstantial evidence points to prolonged action of endogenous estrogen after the menopause age is an important factor.

In regard to diagnosis, we have the suggestive signs and symptoms and the conclusive pathologic diagnosis. The most frequent symptoms in these cases are recurrence of bleeding six months to a year after the menopause, and delayed menopause. The indiscriminate use of large doses of the estrogenic substances during the menopause period with its accompanying episodes of withdrawal bleeding, has in many cases confused the picture. In the years prior to the discovery and use of the estrogenic hormones, every case of postmenopausal bleeding was considered carcinoma until proven otherwise by curettage, whereas, now if the patient has been receiving "shots" one is never certain whether the bleeding is withdrawal bleeding or an early symptom of endometrial carcinoma. When faced with this problem in a patient, it is best to have all estrogenic therapy stopped so as to rule out this as a factor in the bleeding, and then, should there be further bleeding or

Fig. 1

Photomicrograph showing the effect on the endometrium of weekly injections of 200 R.U. of estrogen for a period of seven months, in a 24½-month-old C.B.A. mouse. At A is an area in which the glands are proliferating rapidly. There is very little intervening stroma and the glands invade the underlying stroma deeply.

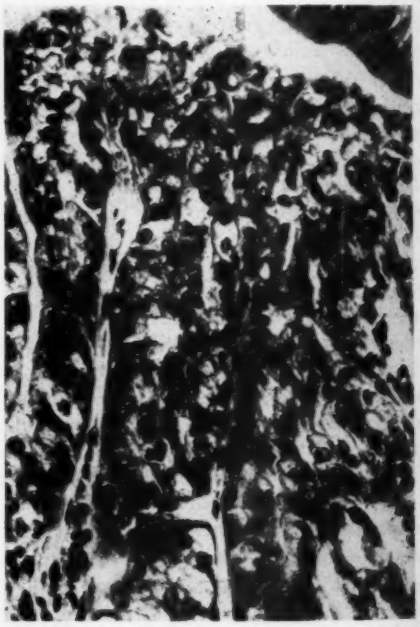


Fig. 2

High power of the same area shown in *Fig. 1.*

watery discharge, curettage should not be delayed.

The positive diagnosis of adenocarcinoma of the endometrium is made by careful curettage. I emphasize that the curettage must be thorough because an early carcinoma in one cornu or a carcinoma obscured by a myoma may easily be missed unless special care is taken to cover the entire surface of the cavity. In cases of recurrent bleeding or persistent discharge after a negative curettage, another currettage should be done.

Papanicolaou[4] in 1928 demonstrated that a vaginal smear was helpful in the diagnosis of uterine carcinoma. Since that time he and Shorr have developed a new staining technic which has enhanced the accuracy of this test. The method is never used as a substitute for curettage but in his hands it has proved valuable as a lead in several unsuspected cases. Papanicolaou and Traut in their monograph on this subject conclude as follows:

"We adhere to the position that the vaginal smear should usually be considered as an accessory or preliminary method of diagnosis and that the actual demonstration of the malignant cells in the biopsy specimen should be the basis of decision as to the method of therapy. Certainly this attitude of mind should maintain until we know more about the possibilities of the method, and more particularly, until we know more about the intimate cytology of the malignant cell."

To summarize then, any case of post menopausal bleeding or persistent vaginal discharge should be suspected of having carcinoma until proven free of it.

The problem of clinical classification in fundal carcinoma is much more difficult than it is with cervical carcinoma where the lesion can be seen and the extension to the parametrium palpated. While the pathological grading of carcinoma of the corpus according to cell type and arrangement is now on a firm basis, the clinical classification on a practical basis was long delayed. In 1937 in a study of this problem H. S. Crossen emphasized that the clinical stages cannot be defined by symptoms but must represent the definite extent of the growth as determined by examination at operation and in the laboratory. Hence, the stages of the classification to be made before operation as a guide to treatment must be defined in terms of pathologic extent which can only be determined accurately after operation. This paradox shows very well the vicious circle of difficulties encountered, and the reason why the solution of this important problem, so necessary for prognosis, was delayed. The division of a continuous process into stages necessitates dealing with borderline areas about which there may be differences of opinion as to preferable assignment. The important thing, however, is not exactly where the lines of division are placed but that they be placed definitely somewhere, and then that this definite classification be used in all clinical work and report of cases. It was found in carcinoma of the cervix that only by accurate clinical classification of cases, as proposed by the League of Nations Committee, could a clear basis for comparison of results of treatment be obtained, and the same is true in corpus carcinoma.

The classification proposed by H. S. Crossen[5] into six groups is shown in *Figs. 3, 4* and *5*.

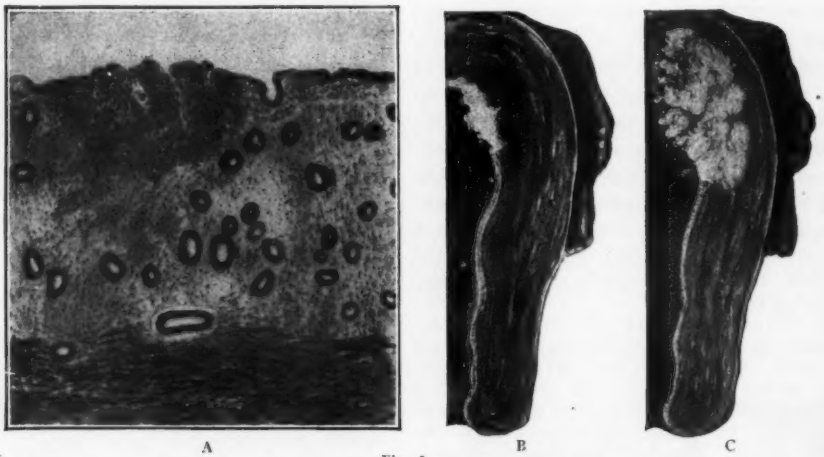
It is certain that, if a practical classification such as this one is applied by surgeons generally and the results are recorded, much will be added to our knowledge of prognosis in corpus cancer.

Now in regard to the treatment of endometrial or corpus cancer, this has been developed in much the same way that the treatment for cervical cancer. First reliance was placed entirely upon operative removal of the pelvic organs. In cervical carcinoma the results of radiation therapy made it, at first, a competitor to operation, and later the choice of treatment in this type of cancer. Formerly, in cases with cervical carcinoma, the patient's physician sent her for hysterectomy and the family was sure that radical removal of the pelvic structures would cure the cancer and, that this was the only treatment that would cure. Now the patient and her family know more about radiation and the family physician has explained that radiation can reach far beyond the knife, so that this fact no longer has to be explained in detail to each patient sent in for treatment of cervical carcinoma.

In corpus carcinoma it has long been known that better results may be attained after removal of the pelvic structures if postoperative x-ray

treatments are given. Later, preoperative radiation was used and it was found that it reduced the infection present, hence the danger of postoperative peritonitis and also it lessened the liability of operative metastases by devitalizing the carcinoma cells. The shift in treatment in corpus cancer has been made more easily than that in cervical cancer because it has been to radiation plus operation rather than radiation instead of operation. More recently the use of intrauterine radium has been advocated as a preoperative procedure. With this the radiation is given in the center of the malignant mass and the parametrial regions. We have been using this method now for several years and it has been used by other groups of workers in the field long enough to demonstrate its effectiveness.

It is a long step from the use of an improve-

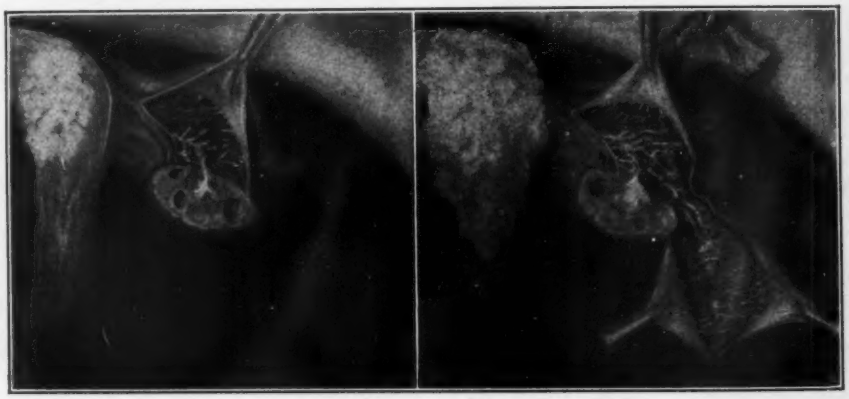


A B C

Fig. 3

Classification of endometrial carcinoma as proposed by H. S. Crossen. (From "Crossen's Operative Gynecology," C. V. Mosby Co.)

A, First Stage—Endometrium only involved.
B, Second Stage—The myometrium involved but not beyond the middle.
C, Third Stage—Myometrium involved extensively (beyond middle).



A B

Fig. 4

A, Fourth Stage—Involvement of removable adjacent structures.
B, Fifth Stage—Involvement of irremovable structures, but the primary tumor mass can still be removed.
(From "Crossen's Operative Gynecology," C. V. Mosby Co.)

ment by the specialist to its incorporation into the daily medical and surgical work. The general surgeon who usually sees these cases first is working hard to give his patients the best service he is not going to depart from his usual plan of immediate complete hysterectomy and bilateral salpingo-oophorectomy unless he can see some agreement among gynecologists. That agreement is gradually emerging and in many of the outstanding centers preoperative radiation followed by operation has become the accepted plan of treatment.

In general the operability of the patient is considered in determining treatment. However, unless there is some serious contraindication every patient with fundal carcinoma should be given the benefit of exploratory operation before being considered inoperable from a technical standpoint.

The problem of distributing the intra-uterine radium is one on which much work has been done. It is necessary to use several centers of radiation in order to provide even distribution over the endometrium and hence avoid point sloughing on the uterine wall. Schmitz[6] devised a Y-shaped radium filter in 1933, and he reported his results with this in 1941. Heyman[7] fills the uterine cavity with radium in small screened buckets and gives each case the same number of hours of treatment so that a large cavity will receive a larger dose in milligram hours than a small one.

Another method which has been tried is to use additional radium capsules in the uterine horns beside the central tandem. Sampson[8] did some interesting experiments with extirpated uteri to determine the effectiveness of this method. He injected the uterine cavities with 20 per cent sodium iodide to determine the size and shape of the cavity, and along with this he introduced tandems of radium to show their relation to the lateral walls and the cornua of the cavity. He found that one horn was always missed and sometimes both. He then used supplementary capsules with wire attached but found that one horn was frequently missed. In attempting to solve the problem of providing a practical method of distributing the radium which could be used with the radium usually available in the hospital, H. S. Crossen[9] worked out the following technic.

The distributor is made of ordinary flexible

Fig. 5

Involvement of surrounding structures to such an extent as to preclude even palliative removal of the main tumor mass. (From "Crossen's Operative Gynecology," C. V. Mosby Co.)

wire, called No. 18 soft weaving wire, obtainable at the hardware store. The details are shown in the slide. The wire at the start is 7¼ inches in length. The first small loop is 1⅞ inches from the end and is ⅛ inch in diameter. The small loops are ½ inch apart so that the applicator when finished will be the proper length for cavities 2½ to 3½ inches in length and can, with slight adjustment, be used in shorter or longer cavities. Up and down movements are controlled by the suture which is passed through the cervix and through the loop of the distributor. Movements in other planes are controlled by the loop which extends into the vagina and by the vaginal packing above and below this loop (*Fig. 6*). The cavity is explored carefully to determine its contour and if one horn is deeper than the other or the main mass seems to be on one side, an extra radium capsule is placed on that side. As shown in *Fig. 7* the dose varies with the size of the cavity between 3000 and 4000 mg. hr.

Any manipulation within the cavity must be done with extreme care to prevent perforation and the radium application is no exception. We use vaseline gauze to prevent irritation from the pack and tie the suture over a dry sponge at the introitus to hold the pack in and make removal easy.

In cases where there is no definite contraindication, the operative removal of the organs is carried out in three to four weeks after the radium treatment. When there is a definite contraindication to the major operative procedure the radium dose is pushed to the limit and this is followed by deep x-ray therapy. These patients are then checked by curettage in two months to see if additional radiation is needed, and again in five months.

Finally, in regard to prophylaxis or prevention of adenocarcinoma of the endometrium, as stated in the beginning of this paper, late menopause and marked persistent hyperplasia are now considered as important factors in the development of corpus cancer. The persistent estrogenic activity causing delayed menopause past fifty causes recurrent stimulation of the endometrium, which, at this time in life is

Introducing and Fastening the Wire Distributor

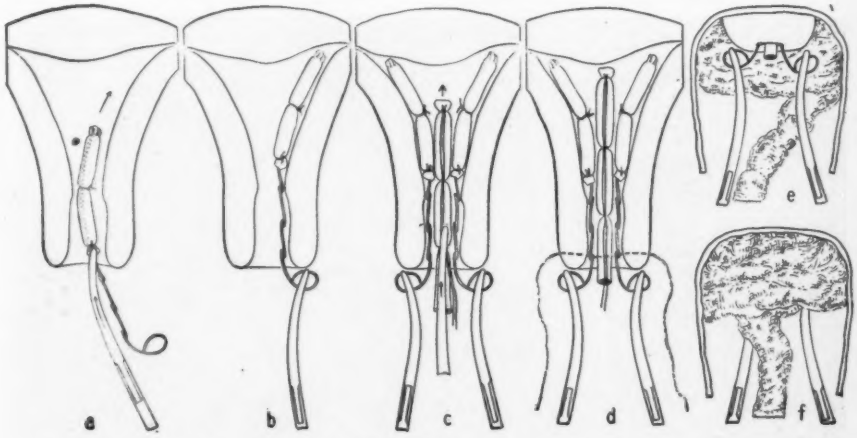


Fig. 6

Showing details of introduction and fastening Crossen distributor. (From "Crossen's Operative Gynecology," C. V. Mosby Co.)

a. The distributor is grasped about the middle with a Kelly forcep and introduced through the dilated cervix. b. The distributor in place and held firmly there by an assistant. c. The two distributors in place and held by forceps while the tandem is being introduced between them. The firm forcep hold is maintained until the suture, which passes through the cervix and the eye of each distributor and the tandem tubing, is in place as shown in d, and also until the vaseline-gauze packing is in place back of the cervix (e) and in front of the cervix and extends beyond the distributor handles as in f. The forceps are then removed and the long suture is tied over the packing to hold it in place.

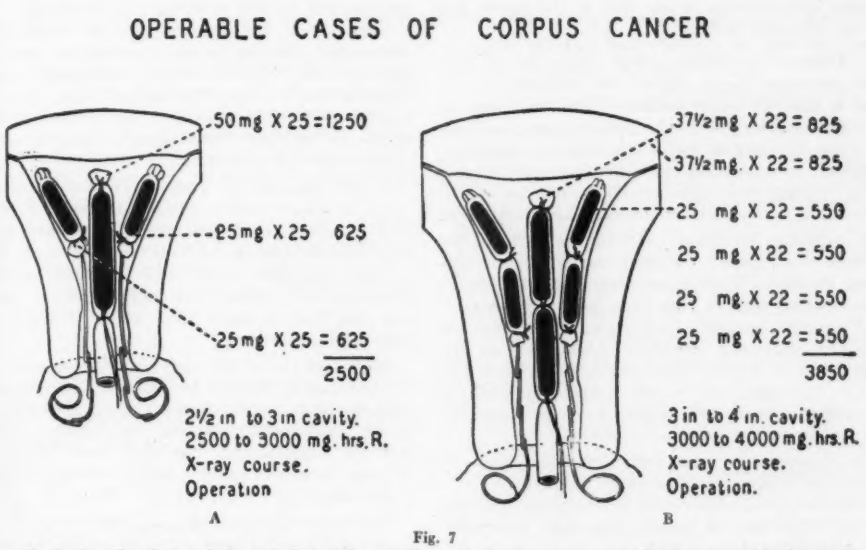

OPERABLE CASES OF CORPUS CANCER
50 mg X 25 = 1250
25 mg X 25 625
25 mg X 25 = 625
2500
2½ in to 3 in cavity.
2500 to 3000 mg. hrs. R.
X-ray course.
Operation
A
37½ mg X 22 = 825
37½ mg. X 22 = 825
25 mg X 22 = 550
25 mg X 22 = 550
25 mg X 22 = 550
25 mg X 22 = 550
3850
3 in to 4 in. cavity.
3000 to 4000 mg. hrs. R.
X-ray course.
Operation.
B

Fig. 7

Distribution of radium and the unit dosages in operable cases of corpus cancer. A. Small uterus with three unit distribution. B. Large uterus with six unit distribution. (From "Crossen's Diseases of Women," C. V. Mosby Co.)

normally inactive and atrophic. We feel that it is better to stop this estrogenic activity at approximately fifty, or sooner if the periods are abnormal, rather than run the risk of continued endometrial stimulation. This can easily be done with a radium treatment and the possibility of early carcinoma at the time is ruled out by curettage. Persistent hyperplasia even in younger women should be watched carefully and estrogenic therapy avoided. We have a case of carcinoma in a 35-year-old woman who on two previous curettements had shown a marked hyperplasia. For six months prior to the curettage (showing an endometrial carcinoma) she had been given theelin several times a week by her family physician. There are other such cases reported in the literature.

Menopause symptoms are usually controlled by thyroid if needed, and small doses of stilbestrol or true estrogens. Engle in a recent article was able to control most of his menopausal cases with thyroid plus phenobarbital; hence, the practice of giving large doses of the estrogenic substances in patients of menopausal age is not only not indicated but may be very harmful.

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DISCUSSION (*Abstract*)

Dr. J. Milton Singleton, Kansas City, Mo.—I should like to ask Dr. Crossen what he considers the advantage of radiation before hysterectomy in carcinoma of the fundus. I am one of those who still believe hysterectomy first, then followed by radiation, is the method of choice.

I have had some patients who have, with radiation, very severe cramps, very severe pain and nausea, much more extreme before the uterus is removed than after, and I see no particular advantage in radiation before hysterectomy.

I should like to ask him again, a second question, whether he has had any experience in the use of

pyridoxin hydrochloride in the relief of the nausea and vomiting following radiation.

Dr. William T. Kennedy, New York, N. Y.—My feeling about the use of radium and radiation in carcinoma is that we might radiate a few days, four or five days probably, at most, before removal of the uterus, but it seems to me that every day lost is to the patient's disadvantage, and that hysterectomy and bilateral salpingo-oophorectomy, taking out the cervix, of course, is a very important and necessary thing to do.

You probably remember that in the early stages radium in small doses stimulates the growth of carcinoma; therefore, small amounts of radiation, should be avoided; and who can tell when any carcinoma gets a small or large amount? I do not know. It does not make much difference sometimes where you put the radium, for if it is more than a centimeter and a half from the carcinoma, only a mild amount of radiation hits a part of the growth. Hence, it is very important to get the uterus out in fundal carcinomata.

Early diagnosis is most important, but many of our cases have gone to some other physician or surgeon and have had some form of treatment, and the delay of getting out the growths has been detrimental to the eradication of the trouble.

Dr. J. I. Hofbauer, Cincinnati, Ohio.—Dr. Crossen introduced his presentation by discussing the etiology of endometrial hyperplasia. Hyperplasia has been experimentally produced by the administration of estrogens for a long period of time. It takes weeks and months, sometimes even a year. We did extensive experimental work at Johns Hopkins in 1930 and 1931 and produced endometrial hyperplasia within three to four weeks in guinea pigs by implanting at weekly intervals into the musculature of the thigh bits of the anterior pituitary, obtained from oxen.

We reported our experiments in *Surgery, Gynecology and Obstetrics* in 1932.

The time element in these experiments is of importance. Endometrial hyperplasia was evident in association with quite a number of ovarian follicles containing large amounts of estrogenic substances, within a few weeks.

Animals which had received large amounts of estrogens showed the anterior pituitary in a state of distinct hyperplasia. It is questionable, therefore, whether endometrial hyperplasia represents the effect of undue stimulation for a protracted period of time by an over supply of estrogens or is primarily due to overactivity of hormones derived from the anterior pituitary which in turn stimulate the production of abnormally large amounts of follicular hormones. Determination of the primum movens has a decided influence on the way the condition should be attacked therapeutically. In 1922, we introduced irradiation of the hypophysis with a view of decreasing the gland's overactivity. At present, administration of testosterone or stilbestrol serves the purpose in a similar way.

Dr. H. A. Gamble, Greenville, Miss.—At most of the surgical and medical meetings I have attended there is a paper upon the diagnosis of the cause of postmenopausal bleeding, in which discussions stress is laid upon the value of a diagnostic curettement and frozen tissue section biopsy. Personally I have come to the conclusion that such teaching is not to the best interests of the patient. All postmenopausal bleeding is due to a pathological condition in the uterus.

In our experience in over 75 per cent of the cases it is due to cancer and in doing a diagnostic curettement it is possible for one to miss the involved area and unfortunately for the patient this frequently happens. I have two cases in my own experience in which a diagnostic curettement was done. A biopsy was negative and both patients died within a few years of inoperable carcinoma.

There have been three cases within the past year of postmenopausal bleeding in which a diagnostic curettement was done, one by myself and one elsewhere, and in all of which notwithstanding the negative findings a complete hysterectomy was done and upon opening the uteri there was found a small carcinomatous growth in the fundus.

Postmenopausal bleeding, as I said before, is always due to pathology of some character within the uterus or adnexa. In most instances it is of a malignant character and we feel that the patients' interests are best conserved by the removal of any pathological uterus at this stage of a woman's life.

Dr. Crossen (closing).—Dr. Singleton asked why we are beginning to use preoperative radiation in fundal carcinoma. We have been using it for the past two or three years. It has been shown quite definitely that the use of radiation prior to the radium treatment in cervical carcinoma clears up the infection and in this way it enables the radium to have a more potent effect upon the tissues. In the second place, it cuts down the instance of postoperative infections which are sometimes very serious, occasionally fatal.

The same thing applies to a fundal carcinoma. We feel that radiation cuts down the infection present and reduces the possibility of postoperative infections, especially peritonitis and it also devitalizes the carcinoma cells. The operation should be carried out before these carcinoma cells revive and begin to multiply.

The point which Dr. Kennedy raises is an excellent one, that we should get the uterus out before these cells begin to multiply. Dr. Arneson made a study of cases in which radium had been given with subsequent removal of the uterus, and found that the carcinoma did not begin to come back or show any activity until about three or four weeks after the radium treatment. We operate about three to four weeks after the radium treatment while the cancer is still inactive.

With regard to Dr. Hofbauer's question, I do not know whether it is the anterior pituitary or the estrogens which cause the hyperplasia. Both should be avoided if not necessary. In patients in the menopause, the endometrium should be low and atrophic. We do know that estrogens stimulate endometrial growth and

we feel that this stimulation is dangerous in the menopause age.

I certainly agree with Dr. Gamble that in a suspicious case where a first curettage shows no cancer, if the patient continues to bleed, and granuloma tumor of the ovary is ruled out, that patient should be curetted again. If after the second negative curettage she continues to have discharge from the uterus, hysterectomy should be done.

Papanicolaou and Traut reported finding carcinoma cells in the vaginal smear of two cases of proven fundal carcinoma in which two previous curettements had been negative for carcinoma. Evidently the involved areas were missed by the curette.

PERIARTERITIS NODOSA*

CLINICAL MANIFESTATIONS AND POSTMORTEM FINDINGS WITH A REPORT OF SIX CASES

By Wm. H. Higgins, M.D., F.A.C.P.
Richmond, Virginia

A clinician seldom faces a more fascinating diagnostic problem than periarteritis nodosa. Its clinical ramifications and its mimicry of many disease processes more frequently than otherwise postpone a correct diagnosis until the pathologist makes his final report.

PATHOLOGY

The etiology of periarteritis nodosa has long been obscure and has provoked a great deal of speculation since its first description by Kussmaul and Maier[1] in 1866. In recent years intensive studies have brought out many conflicting concepts in spite of well grounded experimental evidence. For example Dr. Pearl Zeek's[6] studies on rats and dogs leads her to suggest that hypertension alone may cause the lesions of this disease. These results together with an analysis of 21 postmortem cases of periarteritis nodosa from the Cincinnati General Hospital convinced her that there are two closely related but independent groups of syndromes. One is the classical periarteritis nodosa due to hypertension and the other is a necrotizing angiitis due to hyperergic vascular reactions. The distinction between the two groups is made largely on the distribution of the lesions and certain cellular changes.

Further experimental evidence on the role of hypertension is the work of Selye and his co-workers who produced lesions of periarteritis nodosa in dogs by unilateral nephrectomy followed by a high salt intake and massive doses of desoxycorticosterone acetate. This suggests that hypertension alone may not be the only factor in the pathogenesis. One may logically ask: if hypertension alone is sufficient to produce periarteritis nodosa why is the disease rare in a series of hypertensives, particularly of the malignant type?

The most significant studies, however, have been carried out by Rich and Gregory[2] who have shown that the process is definitely a manifestation of hypersensitivity. After repeated injections of horse serum in animals histological sections showed beautiful arterial lesions typical of this pathologic syndrome. Every phase of the process encountered in human periarteritis nodosa could be found in the experimental type. According to Rich and Gregory the arterial lesions strongly suggest that periarteritis nodosa represents in effect "hives" of the blood vessels analogous to serum sickness or to generalized anaphylactic reactions produced by other foreign antigens. In addition to foreign proteins these authors have also shown that this disease can result from hypersensitive reactions caused by sulfonamides, bacterial antigens and iodine. These observations clearly indicate that a wide variety of different drugs and chemical substances may produce the lesion depending upon their ability to become antigenic by uniting with the plasma protein. It seems quite possible that periarteritis nodosa may be a type of vascular reaction to various insults of which anaphylaxis as established by Rich may be one. He believes that hypertension is necessary for the production of the aneurysmal type of lesion but that it is not a necessary part of the picture of the disease.

CLINICAL PICTURE

The clinical manifestations and laboratory findings are protean depending on the organs involved and the stage of advancement. More commonly the symptoms at the onset are

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gradual and present the picture of sepsis of unknown origin. As the disease progresses, one's attention is drawn to certain organs or systems which contribute to the confusion and to frequent errors in diagnosis. Fever, malaise, abdominal discomfort, dyspnea and paresthesias are commonly complained of. Specialists in different branches of medicine have reported the disease as simulating well known clinical entities ranging from obscure neurological syndromes to trichinosis or undulant fever. Laboratory studies are not particularly helpful except in a negative way, unless an eosinophilia is present. In 1939 Rachemann[3] reported the frequent occurrence of eosinophilia sometimes reaching a concentration of 60 to 80 per cent of the white cells. This is particularly true when asthma is part of the symptomatology. In fact it is his conclusion that the particular symptom complex characterized by asthma of the intractable type, pain and numbness in the extremities and an eosinophilia in the blood of at least 25 per cent is probably periarteritis nodosa and the prognosis is bad. A moderate to high leukocytosis is generally present.

This paper deals with six proven cases of periarteritis nodosa one of which is from the personal files of the author. The others are taken from the records of the Medical College of Virginia.

CASE REPORTS

The first case is of particular interest and will be reported in some detail. For the sake of brevity the others will be summarized.

Case 1.—White man, age 55, was referred to me by Dr. Frank Crawford in March of this year, complaining of marked weakness, loss of weight, abdominal discomfort, pain and numbness in his extremities and fever. These symptoms had gradually developed during a period of six months and for the previous four weeks his left arm and hand had become progressively weaker with loss of vision in his right eye. At times there had been some swelling of his legs. Increasing apathy, auditory hallucinations and lack of interest became more manifest, his abdominal distention increased and he finally died rather suddenly. During his hospitalization his fever ran a septic course varying between normal and 103.° His previous history was not significant except for recurring attacks of asthma. For the previous few years he had been very nervous and hypochondriacal.

Physical examination revealed an undernourished man with marked muscle wasting. There was no stiffness of the neck or adenopathy. Heart and lungs were clear. Blood pressure was 140-90, pulse 110, temperature 101.° The brachial vessels showed considerable sclerosis. Over his lower extremities there were numerous purpuric spots varying in size up to 20 mm. in diameter. There were no objective evidences of arthritis but all the joints were painful. The abdomen was not distended and the spleen and liver were not palpable. There was slight abdominal tenderness.

Neurological examination was done by Dr. James Asa Shield, Richmond, Virginia.

Sensory Survey.—There was a burning sensation to pain stimulation on the soles of the feet and diminished sensory appreciation in toes and fingers. Deep pressure was painful generally. The olfactory nerves were subjectively negative. The extraocular muscle movements were normal. Pupils were small, the right fixed. There was no reaction to light. The fundi appeared pale; margins were slightly blurred, especially on the left side. Vision in the left eye was fairly good. The patient had suddenly lost the vision of the right eye two weeks before his admission to hospital. During hospitalization, his optic nerve head on the right side took on the appearance of primary optic atrophy with considerable narrowing of the vessels. A month after admission, a central muscular degenerative choroidal lesion was in evidence when he was examined by Dr. Rudolph C. Thomason. The extra-ocular movements were good. The trigeminal, masseter, and facial nerves functioned. There was bilateral reduction of hearing as shown by the watch test. The vestibular, intermediate, glossopharyngeal, vagus, spinal accessory, and hypoglossal were negative. Deep reflexes were hyperactive and approximately equal on each side.

The superficial reflexes of the cornea were normal, the epigastric reflexes were normal on the right and hyperactive on the left; lateral abdominals and hypogastrics were bilaterally reduced; cremasterics were normal on the right and sluggish on the left.

Pathological reflexes were the Babinski, Chaddock, Oppenheim, Gordon, Schaefer, Sinkler, Kernig, and Brudinski, which were absent. There was no ankle or patellar clonus. The patient's partial paralysis prevented an accurate study of ataxia. There was generalized muscular atrophy and wasting with increased muscle tone and reduced muscle power. There was no muscle paralysis, but much paresis especially in the left arm. Mentally, the patient was confused at times, while at other times he was fairly clear. During his confusion he perceived auditory hallucinations which he had been having for some time prior to admission. Twenty days after admission, the patient began to complain of more weakness in the left hand, and the reflexes in this arm were increased in comparison with the right. This paralysis seemed to progress. His atrophy as well as his weakness progressed.

Laboratory Studies.—Hemoglobin was 40 to 64 per cent; the red blood cells were 2,300,000 to 3,200,000; white cells 9,800 to 15,000; eosinophils 8 to 38 per cent; and non-protein nitrogen 52 mg. All agglutinations were

negative. Stool examinations, blood cultures and spinal fluid tests were negative. Urinalysis was negative. Electrocardiogram (*Fig. 1*) showed T wave changes and reduced voltage. The Wassermann was negative. From this history, physical findings and course of his illness a diagnosis of periarteritis nodosa seemed highly probable (*Fig. 2*).

A complete postmortem examination was made by Dr. J. S. Howe.

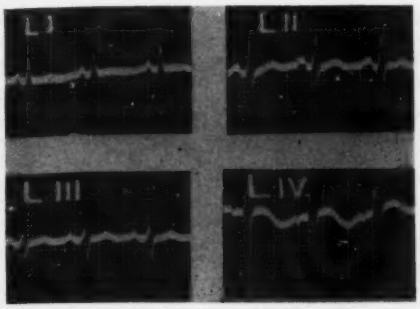

Fig. 1
Early myocardial damage as shown by T wave changes.

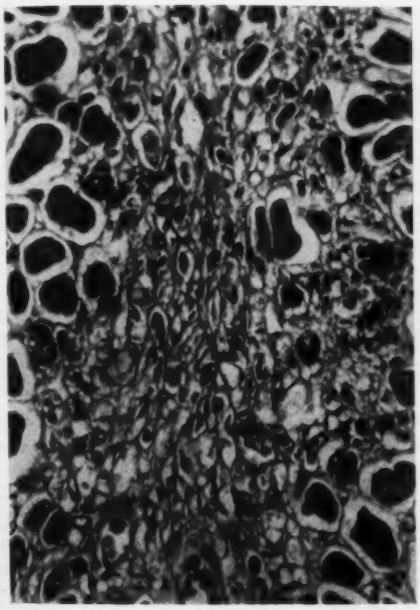

Fig. 2
Section of myocardium from left ventricle showing a focal area in which the muscle fibers have undergone necrosis while the fibrous stroma persists. About the margins of the area, better preserved muscle fibers are seen.

The pertinent findings were periarteritis nodosa involving the splenic, pulmonary and inferior mensenteric

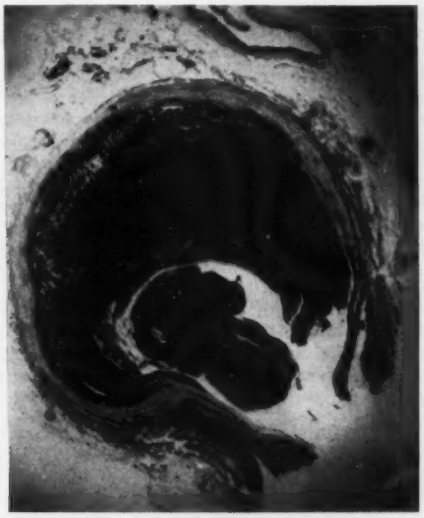

Fig. 3
Photomicrograph showing cross section of aneurysm of superior mesenteric artery filled with laminated thrombus.

Fig. 4
Photomicrograph of section from lung showing a medium-sized branch of the pulmonary artery filled with thrombus. Note the organization at the point of attachment to the vessel wall.

vessels; gangrene of the large intestine with perforation of the splenic flexure; massive recent pulmonary infarct in the right lower lobe; multiple old pulmonary infarcts; bilateral bronchopneumonia; serosanguinous pleural effusion; left empyema; chronic passive hepatic congestion; multiple anemic splenic infarcts; healed renal infarcts; slight hypertrophy of the heart; and petechial rash of the legs. The brain was normal. Microscopically the heart showed interstitial edema and miliary areas of infarction; the lungs, old and fresh hemorrhagic infarcts complicated by secondary inflammation. The vessels appeared large and thin walled and contained thrombi and from the size these might represent aneurysmal dilatation. Section of the inferior mesentery artery showed a very thin walled aneurysm filled with a thrombus, and adjoining the lumen some fresher thrombotic material. Kidneys revealed moderate interstitial fibrosis with round and plasma cell infiltration. An occasional large artery showed a proliferative endarteritis with narrowing of the lumen. In the spleen there was a fresh area of anemic infarction showing a characteristic peripheral hemorrhagic zone (*Figs. 3* and *4*).

Case 2.—A colored woman, age 32, developed colicky abdominal pains followed by nausea and vomiting. She had had dyspnea on exertion with slight precordial pains. There had been marked loss of weight, the appetite had been poor and she had had frequent painful urination. Her previous history had not been significant, and there was no record of asthma.

Physical examination disclosed an anemic emaciated woman. All cranial nerves were normal. The heart was enlarged with a systolic murmur over apex and a pericordial friction rub to the left of the sternum. Her blood pressure was 200-110, with sclerosis of the vessels. She had marked tenderness over the epigastrium and upper right quadrant. There was edema of the ankles and feet and both patella jerks were absent. The eye grounds showed hemorrhages and exudates.

The patient died following a severe epigastric pain suggesting a perforation.

Laboratory studies disclosed 1,300,000 red blood cells; hemoglobin 20 per cent; white cells 17,000; eosinophils 1 per cent and non-protein nitrogen 240. The spinal fluid was negative except for 290 pressure. Specific gravity of the urine was 1.010; albumin plus 1. Temperature was normal to 100.°

Postmortem diagnosis was: (1) generalized periarteritis nodosa; (2) subacute pericarditis, and foci of myocardial degeneration; (3) necrotizing inflammatory areas with multiple arteriolar thromboses; (4) cirrhosis and inflammatory alterations of hepatic arterioles; (5) endarteritic proliferative occlusion; and (6) perforation of the duodenum.

Case 3.—A colored male, age 32, became ill 6 months before hospital admission with severe pains in both hips and legs. There was nausea and vomiting, rapid loss of weight, generalized weakness and inability to walk. He also complained of dimness and double vision.

Physical examination disclosed an extremely emaciated, anemic individual. The heart was enlarged. Blood pressure was 254-170. All reflexes were normal but there was edema of both optic discs. After he entered the hospital convulsions developed followed by unconscious spells.

Specific gravity of the urine was 1.010; albumin plus 2. The red blood cell count was 3,000,000; hemoglobin 50 per cent; white cells 15,000. Eosinophils 1 per cent; non-protein nitrogen 100. Spinal fluid pressure was 385, cell count 1, protein 200. Temperature normal to 100.°

Postmorten examination showed (1) periarteritis nodosa involving vessels of the kidneys, pancreas, adrenals, liver and esophagus; and (2) purpuric spots over the chest, abdomen and legs.

Case 4.—In a colored man, age 31, the history and examination were incomplete. His chief complaint was severe headache with a history of tuberculosis and three attacks of endocarditis of unknown origin. Blood pressure was 155-110. Spinal fluid pressure was 100 with normal cell count. His Wassermann was positive. Shortly before death he had an acute attack of abdominal pain.

Postmortem examination showed (1) periarteritis nodosa involving the hepatic, renal and adrenal vessels, and hemorrhage into the peritoneum from two large veins on the liver; (2) rupture of a small superficial aneurysm in the liver; (3) myocardial hypertrophy with pericardial adhesions.

Case 5.—A white man, age 43, gave a history of nephritis for two years. He entered the hospital with edema of the face and ankles. There was a progressive loss of vision, weakness, severe headaches and he was irrational at intervals.

Physical examination disclosed an anemic looking individual with fundi of both eyes showing edema and arteriosclerosis with scattered hemorrhages and exudates. The heart was enlarged, blood pressure 190-130, and there was edema of the ankles. His temperature was 99 to 102;° spinal fluid pressure 260 with normal cell count; and the electrocardiogram showed marked myocardial damage. Urinalysis showed specific gravity 1.006; albumin plus 3; many red cells in the sediment. The hemoglobin was 70 per cent; red cells were 4,700,000; white cells 10,900; eosinophils 1 per cent and non-protein nitrogen 93.

Postmortem examination revealed (1) periarteritis nodosa involving the kidneys, spleen, adrenals, pancreas and prostate.

Case 6.—A colored woman, age 32, had felt badly for a year and more recently complained of dyspnea, swelling of the extremities, weakness and headaches. She said that she had had pains around the heart and abdomen for many months. Her appetite had been poor and she had had attacks of nausea.

Physical examination disclosed an anemic woman with marked retinal hemorrhages and exudates. Her heart was enlarged; blood pressure was 230-160; and she had edema of the sacrum and extremities.

Specific gravity of the urine was 1.012; albumin was

plus 4; there were red cells and white cells in excess in the sediment. Hemoglobin was 68 per cent; the red blood cell count was 4,600,000; white count 11,000; eosinophil 1 per cent and non-protein 51. The electrocardiogram showed myocardial damage. The temperature was 98 to 104.°

Postmortem examination showed (1) periarteritis nodosa involving the adrenal vessels; (2) arteriosclerotic nephritis, and (3) cardiac hypertrophy with coronary sclerosis.

DISCUSSION

An analysis of these six cases shows a remarkable similarity of complaints notwithstanding the fact that the histories were taken by different individuals of varying abilities. In practically every instance in these and other reported cases the symptomatology is so strikingly similar that one is surprised at the small percentage of correct ante mortem diagnoses. It is probably true, that at least 95 per cent are recognized only by the pathologist and many other cases are incorrectly diagnosed clinically as such with final recovery. Unfortunately a biopsy only occasionally provides the necessary information due to the fact that nodules are seldom accessible and a section of muscle rarely contains the specific vascular changes. In spite of a general glandular enlargement these structures only infrequently are diagnostic and their removal is not as a rule helpful. The most promising material for study is vascular nodules and skin lesions such as purpuric spots which are occasionally found. In fairness to the clinical staff it should be remembered that the usual symptoms are in no way specific and may apply equally to a large number of other clinical entities. In this series the ages varied from 31 to 55, although reports on children as young as 2½ years are on record. Males are affected four times as frequently as females and about 50 per cent are found in the third and fourth decade of life. Approximately three hundred cases are now in the literature with naturally many more unpublished. A composite picture of a typical case of periarteritis nodosa could be woven into a record of a young man who for several months had been suffering from loss of weight, weakness, generalized pain in joints and abdomen, swelling of the ankles, dyspnea and marked anemia. He would probably have some neurological manifestations such as optic atrophy, numbness of his extremities, and weakness of one or more groups of muscles. He would show evidences of cardiovascular renal disease and his temperature would vary over a long period. His blood would show a marked anemia, leukocytosis and possibly an eosinophilia. If as Rackemann has pointed out sensory disturbances are included with this syndrome the diagnosis of periarteritis nodosa is probable. Considerable interest is being shown in the neurological manifestations. Boyd has reviewed various psychiatric disturbances presenting such syndromes as delusions of persecution, negativism and dementia. These syndromes have been noted chiefly in the older group. Other symptom complexes have shown meningeal irritations as characterized by convulsions either generalized or jacksonian. Three of our cases had spinal fluid pressures of over 200 mm. of water, one gave a history of recurring convulsions and two others developed mild delirium.

Wechsler and Bender[4] have reported seven cases of periarteritis nodosa with neurological manifestations. They conclude that most of the peripheral nerve lesions are due to infarctions as a result of occlusions in the nutrient arteries in the nerve trunks. Many of the convulsive seizures may be explained on the basis of subarachnoid hemorrhages secondary to involvement of the meningeal vessels.

Pathologic studies indicate that all structures may be involved and the incidence of the most commonly affected organs is as follows: kidneys 80 per cent; heart 70 per cent; liver 65 per cent; muscles 30 per cent and the central nervous system 8 per cent. Not infrequently the mesenteric vessels and adrenal glands show typical vascular changes. Death occurs in at least ninety per cent of cases, resulting most commonly from hemorrhage from a viscus or a perforation in the intestine secondary to an infarct in the mesentery or from renal failure.[5] In our series of six cases there were two fatal intestinal perforations and one hemorrhage from a liver aneurysm.

Periarteritis nodosa, therefore, presents a multiplicity of pathologic and clinical manifestations and should be considered as a possibility in every patient with obscure or generalized symptoms.

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DISCUSSION (*Abstract*)

Dr. Jas. Asa Shield, Richmond, Va.—I am impressed by the consistent tendency of these cases to show symptoms of central nervous system pathology. *Case 2* had absent knee jerks and increase in spinal fluid pressure. *Case 3* complained of muscle weakness, loss of vision, and had convulsions. *Case 4's* chief complaint was severe headaches. *Case 5* had loss of vision, weakness, and headaches. *Case 6* for months had pains, weakness, and headaches.

In *Case 1*, which I saw, the acute blindness of the right eye, the sensory disturbances, the muscular wasting and weakness, the confusion and hallucinations were the symptoms that developed in one who had been gradually getting worse and worse from pains, stomach troubles, and weakness for six months or more.

The objective neuropsychiatric findings in this case were: hyper and hyposensory changes, loss of vision in the right eye, marginal blurring of the fundi, with primary optic atrophy developing in the right optic nerve, increased deep reflexes, diminished superficial reflexes, atrophy and weakness of muscles, mental confusion, and hallucinations.

Here was a man who looked toxic and starved but did not have a peripheral neuritis. He was in too much pain for multiple sclerosis. His spinal fluid was not that of tuberculosis. The acute loss of vision did not go with encephalitis. The acute loss of vision was either acute retrobulbar optic neuritis or vascular in origin.

When Dr. Higgins suggested periarteritis nodosa, we concurred that this vascular disease was the explanation of his condition. Neurologically speaking, periarteritis nodosa should be considered when we have pains or sensory disturbances, muscular wasting and weakness, visual disturbances, and especially with blurring of the optic nerve heads, retinal hemorrhages and exudates.

Dr. T. Dewey Davis, Richmond, Va.—I would like to report a case of my own to illustrate the difficulties in diagnosing this disease. The patient was a girl of 12. After reviewing her history and examining her in her home, I made a tentative diagnosis of periarteritis nodosa which was confirmed by biopsy from the left calf muscle, and was completely substantiated at postmortem examination two months later.

In 1939, when this child was 7 years of age, she began to have attacks of fever of unknown origin. In February 1941 she had what was diagnosed as bronchial pneumonia. In 1942 she had an exactly similar attack. X-ray of the chest showed a peculiar mottled change in the lungs. In March 1942 she had an attack of acute abdominal pain, following which she had a gastrointestinal x-ray with negative findings. From January to March 1943, she remained in the Johnston-Willis Hospital in Richmond, on the pediatric service, complaining of joint pain, recurrent abdominal pain, fever with leukocytosis, marked anemia and multiple leg ulcers which were complicated by thrombophlebitis. A diagnosis of rheumatic fever was made although she did not show any cardiac signs. During this stay she was given nine transfusions with gradual improvement. In October 1943, she was readmitted to the hospital because of an acute attack of abdominal pain suggesting acute appendicitis. This subsided and she was not operated upon.

In February 1944, while on a visit to Texas, she developed gross hematuria associated with mild nitrogen retention and a diagnosis of hemorrhagic nephritis was made. On returning to Richmond, she entered the Medical College of Virginia Hospital on the urological service and had a complete urological study. The diagnosis of hemorrhagic nephritis was confirmed, although it is interesting to note that at no time during this period did she have significant edema.

In July 1944, she had marked recurrence of skin lesions on her extremities which were diagnosed as pyoderma. These lesions cleared rapidly under penicillin therapy at the Johnston-Willis Hospital. On November 11, 1944, she had an acute throat infection followed by cough, fever, hemoptysis, gross hematuria, attacks of abdominal pain and generalized soreness. It was during this episode that I saw her.

This patient illustrates the difficulties of diagnosis in this disease, particularly in its early stages and its varying manifestations which naturally depend on the sites of most active vascular thrombosis. It was rather interesting to see the improvement in her secondary manifestations with penicillin but I am sure that it had no effect on the underlying disease. I hope that a rational therapeutic approach can be developed because I am certain that the disease is more common than we have heretofore felt.

Dr. Pearl M. Zeek, Cincinnati, Ohio.—Yesterday I attempted to present to the Section on Pathology what we have found concerning periarteritis nodosa.

During the last few years, it has been my opportunity to examine the tissues of 62 rats which had this disease and 21 humans who had what was called periarteritis nodosa. The 62 rats were all hypertensive animals. They had been made hypertensive by the Page perinephritis method, in the cardiac laboratory of Cincinnati General Hospital.

Forty-three controls did not show vascular lesions of any kind. Since the lesions were limited to those animals which had been subjected to the silk-perinephritis operation, we had the unusual opportunity of having 62 cases of periarteritis nodosa in which we could tell the exact day which was the earliest probable date on which the disease could have begun.

We killed the animals from 7 days to 54 weeks after the date of operation and examined the vessels grossly and microscopically, and we think we have found a way of diagnosing periarteritis nodosa before there is either necrosis or cellular exudation.

We compared the lesions of periarteritis nodosa in these rats with those in the 21 humans, and it seemed obvious to us from the microscopic sections alone that there were at least two kinds of necrotizing panarteritis in the human cases. One kind was identical with that which we found in our hypertensive rats. The other was not identical.

The one which was identical with that in the rats began in the adventitia, as a swelling and a proliferation of fibroblasts. Later there was necrosis, then exudation with eosinophils, and finally granulation tissue and scar tissue formation. I demonstrated vessels in a human case in which we had a biopsy two months before death, showing that this is the probable sequence of events in the human cases also.

In 15 of our 21 cases in humans, we found this type of lesion and we are calling those 15 cases periarteritis nodosa. In 13 of the 15, there was known hypertension. In one case, no blood pressure was taken and in the other case, only one pressure was taken and it was at the upper border of normal.

The typical thing about the blood pressures in the 13 cases was that it was of the fluctuating type very frequently, with big spikes from day to day. In several cases, it was taken at daily intervals over weeks because the clinicians were interested in the tremendous swings from heights often over 200 mm. down sometimes almost to normal and then back up again. That was also one of the typical findings in the rats which developed periarteritis nodosa.

In the six cases which did not have the lesions which we think are typical of periarteritis nodosa, there was no fibroblastic activity. The lesion began in the intima and not in the adventitia. It was a fibrinoid necrosis from the beginning.

When the lesions become full-blown, there is no way I know that one can tell them from periarteritis nodosa except by looking for granulation tissue in the adventitia, because the necrosis looks the same and finally extends throughout the wall of the vessel. There are eosinophils present in both lesions and extensive exudate of a pleomorphic type.

This concept of periarteritis nodosa is somewhat radical. It has not been noted by others, so far as I know. A review of the literature seems to demonstrate to us that there are lesions of both types labeled periarteritis nodosa.

Dr. Rich, in his report on periarteritis in rabbits, in which he claims to have proved that it is caused by allergy, says that ten of his first group of fourteen rabbits had acute diffuse glomerular nephritis. He did not take their blood pressures. Later, when he used a second group of rabbits, he did not get nearly so high an incidence of periarteritis nodosa as he did in the first group which also had glomerular nephritis.

We think the lesions which he found in the first group may have been associated with hypertension. We do not know how hypertension does this, any more than the allergists know how allergy produces the vascular lesions which are associated with that condition.

Cases of periarteritis nodosa often manifest allergy during the course of the disease. Four of our fifteen cases developed typical allergic rashes before death. In three of the cases it was a terminal manifestation. In one case it developed 46 days after the onset of the typical symptoms of periarteritis nodosa. The clinicians had actually diagnosed periarteritis nodosa long before there was any allergic manifestation.

Also, such cases often present eosinophilia, but the eosinophilia does not come at the beginning of the disease. We have evidence in at least four cases, of marked hypertension existing for weeks, in one case for months, before the onset of periarteritis nodosa.

Therefore we want to give to you the idea of the possibility of two different types of necrotizing panarteritis in human beings, one type fulfilling the criteria that have stood since Kussmaul's day of periarteritis nodosa, and this being associated in some way, which we do not understand at present, with hypertension of a peculiar type, with big fluctuations from day to day, and another type of panarteritis which is associated with allergy but which does not develop the typical granulomatous lesions of periarteritis nodosa.

There is just one other point I wish to mention. The pulmonary arteries were not involved in any of our human cases of periarteritis nodosa nor in our 62 cases of this condition in rats, but were involved in our cases of necrotizing arteritis associated with allergy.

Another differential point is that we have never seen the arterioles in the splenic follicles involved in periarteritis nodosa while they are characteristically involved in the type of necrotizing arteritis which we found in association with allergy.

This report today is a beautiful demonstration of five cases of periarteritis nodosa associated with hypertension and a case with pulmonary involvement, which probably was an allergic reaction.

Dr. M. Pinson Neal, Columbia, Mo.—As a pathologist, I feel that a word of caution is here needed. The names of Harris and Friedrichs, of New Orleans, have not been introduced into this discussion on periarteritis nodosa by the essayist, yet they experimentally produced the condition with filtrates prepared from human lesions which they felt definitely established the etiology to be a filtrable virus. Others have held the same opinion. Irrespective of the work of Harris and Friedrichs, that of Rich and his co-workers and others who have used various injections of toxins, bacteria, and bacteriological products to produce allergic or sensitization reactions, the final chapter on causation of this disease has not yet been written.

Dr. Higgins, in reporting his *Case 1*, refers to multiple infarctions of various organs within the body. That is not a manifestation of allergy. It is a manifestation of infection in the blood stream, with localiza-

tion and a blocking of blood vessels that causes death of tissue.

The rheumatic syndrome is inseparable from that of periarteritis nodosa. The cardiac and vascular lesions, the myalgia, the joint pains, the complications, the skin lesions are alike. The histologic studies of the rheumatic heart with Aschoff's nodules or Aschoff's nodules occurring along the vessels of other organs than the heart are almost the same as the vascular lesions of periarteritis nodosa. It requires meticulous care and sometimes guesswork to say whether you will call it the one or the other.

A streptococcus by many of us is accepted as the etiologic factor in rheumatic fever. It is accepted as a causative factor of some types of arthritis. There are many who deny that a streptococcus is the cause of either rheumatic fever or arthritis, because in many instances the organism cannot be demonstrated. It has not regularly been obtained from blood cultures or lesions of the disease.

Simply because it is not demonstrable is no proof that it has not been there, done its damage, and been overcome, or that it may not still be there and the bacteriologist fail to show it. The same may be true in periarteritis nodosa.

Streptococci notoriously damage vascular walls. The lesions may be a simple degenerative process, that of an inflammatory exudate, or a destructive thing with even abscess formation.

I maintain the final chapter, and the last word, on the cause of periarteritis nodosa has not yet been told. Even bacterial allergins have not been accepted or disproved.

Dr. Higgins (closing).—I want to thank Dr. Zeek especially for coming and giving us a summary of her studies which she has been carrying on in this most fascinating problem. Not being a pathologist I cannot cross swords with these eminent specialists but there are certain impressions which I have gotten in reviewing their work.

For example, if I understand Dr. Zeek correctly, she believes that hypertension is the major factor in producing experimental periarteritis nodosa, although in her cases there was an associated perirenal infection which might produce a bacterial antigen, thereby bringing about a hypersensitivity. If hypertension is the underlying factor it is strange that so common a disease would rarely produce a human periarteritis.

Dr. Neal refers to the rheumatic syndrome and the close similarity of these lesions with those of periarteritis. This is true but I have found no record of anyone who reproduced Aschoff bodies experimentally along with the lesions of periarteritis nodosa. Also I see no reason for suspecting the streptococcus of being the underlying agent when the disease can be readily reproduced by chemical or serological means.

Rich's work may not be the final word but up to the present time it is the most plausible theory under consideration.

THE EFFECT OF TRANSTHORACIC VAGOTOMY UPON THE FUNCTIONS OF THE STOMACH AND UPON THE EARLY CLINICAL COURSE OF PATIENTS WITH PEPTIC ULCER*

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Two important mechanisms regulate gastric secretion and motility and may influence the development of peptic ulcer. One is hormonal or chemical and is usually activated by the presence of food in the stomach or duodenum. The other is nervous and responds to stimuli of a neurogenic, psychogenic, or reflex nature. The visceral efferent and afferent fibers of the vagus are known to play an essential role in the neural regulation of gastric motor and secretory function. Conventional medical therapy of ulcer is usually directed toward both mechanisms.

There are several interesting recent developments in the treatment of ulcer which directly affect the chemical mechanism. Tui, Wright, Mulholland, Galvin, Barcham, and Gerst[1] have reported the use of a protein hydrolysate diet. Ivy[2] has studied the effect of enterogastrone. McElin and Horton[3] have employed "benadryl," an antihistamine preparation.

Refractory ulcer may also require surgery. The operation conventionally employed, subtotal gastric resection, includes excision of the antrum of the stomach, exclusion of the duodenum, and also removal of a portion of the acid glands of the fundus. The operation interrupts the chemical mechanism and has proved an effective treatment for many patients. It may, however, be associated with poor nutrition or occasionally the development of a stoma ulcer. Subtotal gastric

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*From the Departments of Surgery and Biochemistry of Duke University School of Medicine, Durham, North Carolina.

resection does not interfere with neural motor and secretory function.

This paper deals with the results of a surgical approach that alters the nervous mechanism by removing the vagus nerves and branches about the lower end of the esophagus. Unilateral or partial vagotomy in patients with peptic ulcer has been described by several authors. Weinstein, Colp, Hollander, and Jemerin[4] review these earlier procedures and report six additional patients with incomplete vagotomy and no definite therapeutic effect. Complete vagotomy evidently was first consistently accomplished by Dragstedt[5] in 1943.

Dragstedt[6] summarized the physiological and clinical observations that led to his use of complete vagotomy as an operation for peptic ulcer. He demonstrated that ulcer patients had an excessive continuous secretion of gastric juice and that this juice was often more than normally acid. The hypersecretion occurred during resting and night hours when the stomach was not protected by neutralization of acid by food. Dragstedt considers the possible causes of this hypersecretion and says that while it might be related to a continuous absorption of chemical gastric secretory stimuli such as histamine, it seems more probable that abnormal activity of the vagus secretory mechanism is responsible. He, therefore, undertook a study of the effects of vagotomy.

Dragstedt and his associates[5,7,8,9,10] have reported the physiological and clinical effects of supradiaphragmatic section of the vagus nerves as performed on more than 32 patients since 1943. They conclude from studies of these patients that vagotomy is an effective treatment of ulcer and that it reduces the volume and acidity of the secretions of the fasting stomach. They say that the empty stomach of ulcer patients often displays hypertonicity and hypermotility with exaggerated hunger contractions and that these are returned toward normal after complete vagotomy. They believe that the operation abolishes the secretion of gastric juice produced by a sham meal or by insulin hypoglycemia, and that it has little or no effect on the response to histamine or caffeine. They conclude that both excessive motility and excessive secretion of acid may produce an ulcer in the stomach and maintain its chronicity but that of these two factors hypersecretion is the more important.

In June of 1944 a clinical investigation of the therapeutic and physiologic effects of vagotomy was begun at Duke Hospital. Twenty-five patients with refractory peptic ulcer have now been treated. Seven have been under observation less than four months and will not be reported in detail. The operation employed has differed only slightly from that of Dragstedt. It consists of a transthoracic approach through the bed of the left eighth or ninth rib (*Fig. 1*). The pleura over the posterior mediastinum is divided. The esophagus and vagus nerves are freed by blunt dissection and elevated. Traction on the elastic esophagus easily identifies the less elastic

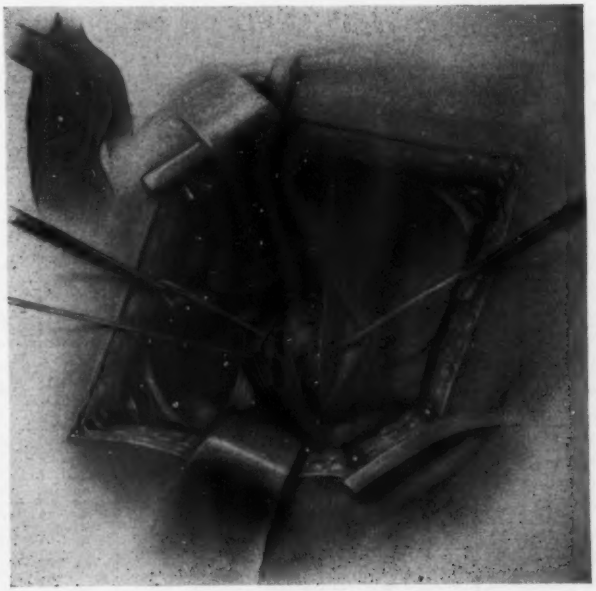

Fig. 1

Supradiaphragmatic transthoracic vagotomy is performed through the eighth or ninth rib bed. Ten cm. of each vagus nerve trunk is excised and the plexus of nerves about the lower esophagus is dissected free and excised or evulsed.

nerve trunks and branches. The two vagus nerves and their branches are followed upward to a point 10 to 12 cm. above the diaphragm and there ligated and divided. The nerves and their branches are then dissected downward to the level of the esophageal hiatus of the diaphragm. Traction permits low ligature and division of the distal end of the trunks. The tied ends then retract below the level of the diaphragm. The excised segments measure about 10 cm. in length. The esophagus is thoroughly examined and stretched to identify and excise or evulse any small nerve fibers that may remain. It is thought that the defect in the vagus nerves thus produced may minimize or prevent late functional nerve regeneration without transplanting the vagus nerves as described by Dragstedt. The operation has been performed without mortality, or infection of the pleural cavity.

The clinical record of the first 18 patients treated by vagotomy is abstracted in *Table 1.* The patients have been followed 4 to 18 months since operation. All ulcers have healed and there has as yet been no evidence of recurrence. The patients ranged from 27 to 62 years of age. Symptoms of ulcer have been graded on a one to four plus basis for convenience.

Pain was a major symptom. It was intermittently severe in 11 patients and continuous and intractable during hospital medical management in 4. Six patients experienced considerable difficulty with recurrent episodes of obstruction and vomiting. Seven occasionally experienced vomiting. Two patients had had recurrent massive hemorrhages; one had vomited a moderate amount of blood. Nine occasionally had occult blood in the stools or traces of blood in emesis. Ulcer symptoms had been present from 3 to 35 years before vagotomy. The average duration was 11 years.

Thirteen patients had duodenal ulcer, four had stoma ulcer, and one had both a large gastric and a small duodenal ulcer. Five patients had had operations for closure of perforated duodenal ulcer. Three of the patients with stoma ulcer had had gastro-enterostomy and one a gastric resection. One patient had had a gastro-colic fistula repaired and two had had appendectomy. Fifteen of the eighteen patients were

BEFORE VAGOTOMY										AFTER VAGOTOMY					
AGE	DEGREE OF ULCER SYMPTOMS			DURATION OF SYMPTOMS	TYPE OF ULCER	PREVIOUS SURGERY			ABLE TO WORK	ABLE TO WORK	PERIOD OF OBSERVATION	GAIN OF WEIGHT	DEGREE OF ULCER SYMPTOMS		
	Pain	Vomiting	Hemorrhage			Closure of Perforation	Resection or Gastro-enterostomy	Gastro-colic Fistula or Appendectomy					Pain	Vomiting	Hemorrhage
32	+++	+	+	6 years	Duodenal			1938	Yes	Yes	18 months	14 lbs.	0	0	0
35	+++	+	+	12 "	"	1942			No	Yes	18 "	30	0	0	0
44	++	0	++	29 "	"	1924 1944			No	Yes	17 "	48	0	0	0
29	+++	+	0	15 "	"	1940		1930	No	Yes	15 "	14	0	0	0
41	+++	+++	0	7 "	Stoma	1941	1942	1943	No	Yes	15 "	14	0	+	0
43	++	++	++++	9 "	Duodenal				No	Yes	14 "	16	0	0	0
36	++++	+	+	16 "	"				No	Yes	11 "	6	0	0	0
62	+++	+++	0	35 "	"				No	Yes	11 "	12	0	0	0
33	++++	+++	+	8 "	"				No	Yes	10 "	10	0	0	0
38	+++	++	++	7 "	"				No	Yes	10 "	0	0	0	0
48	+++	++	+++	7 "	Stoma		1943		No	Yes	10 "	25	0	0	0
43	++++	++	++	6 "	"		1940		No	Yes	10 "	10	0	0	0
41	+++	++	++++	3 "	Duodenal				No.	Yes	9 "	20	0	0	0
27	++	+++	++	5 "	"	1944			No	Yes	9 "	27	0	0	0
31	+++	++++	++	3 "	Stoma		1945		No	No	9 "	-17	0	+	0
30	+++	0	0	8 "	Duodenal				Yes	Yes	8 "	7	0	0	0
29	+++	+++	0	10 "	"				Yes	Yes	5 "	8	0	0	0
48	++++	0	0	3 "	Gastric & Duodenal				No	Yes	4 "	10	0	0	0

Table 1

not able to work at the time of the vagotomy.

One patient only has been unable to work since operation. This man has a severe psychoneurosis and a difficult home problem. He has developed diarrhea and lost 17 pounds in weight. Seventeen patients have returned to full activity usually at heavy manual labor. They are eating regular meals without dietary restriction or medical therapy. One is a dypsomaniac. These seventeen have gained weight up to a maximum of 48 pounds. The average was 16 pounds. One patient was not undernourished before vagotomy and did not gain over his preoperative weight. Ulcer symptoms of pain and bleeding have not recurred in any patient. Obstruction and retention necessitated gastroenterostomy in one of these eighteen patients and Finney pyloroplasty in two. Vomiting has occurred in only two patients after their discharge from the hospital. This last observation is significant because of the clinical, x-ray, and physiological evidence to be reported below relative to delay in emptying of the stomach after operation.

The esophagus, stomach, duodenum, and upper small intestine were examined by barium meal and x-ray before and also 1 to 3 weeks, 3 or 4 months, and in some instances again 12 or more months after vagotomy. The observations are summarized in *Table 2*. Before operation ulcer craters were visualized in 8 patients and deformities in all but one. This patient had a stoma ulcer and had had recurrent pain and bleeding. After vagotomy the eight ulcer craters could not be visualized. Some degree of scar tissue deformity remained. Only one duodenum appeared normal. *Figs. 2* and *3* illustrate this healing. Fluoroscopy before vagotomy revealed that barium given 4 to 6 hours before examination had passed on through

EXAMINATION OF STOMACH & DUODENUM BY X-RAY AFTER BARIUM MEAL

BEFORE VAGOTOMY						AFTER VAGOTOMY				
Age of Pt.	Location of Ulcer	Crater Visualized	Deformity Visualized	4 to 6 Hour Retention	Peristalsis	Crater Visualized	Deformity Visualized	4 to 6 Hour Retention	Peristalsis	Weight Gain
32	Duodenum	Yes	Yes	0	Active	No	No	0	Active	14 lbs.
35	"	"	"	0	Hyperactive	"	Yes	30%	"	30 "
44	"	No	"	0	Active	"	"	20%	Sluggish	48 "
29	"	"	"	5%	"	—	—	—	—	14 "
41	Stoma	Yes	"	0	"	"	"	5-50%	Sluggish	14 "
43	Duodenum	"	"	0	"	"	"	90%	"	16 "
36	"	No	"	0	"	"	"	80%	Active	6 "
62	"	Yes	"	0	"	"	"	75%	Sluggish	12 "
33	"	"	"	10%	Sluggish	"	"	100%	None	10 "
38	"	No	"	0	Active	"	"	80%	Sluggish	0 "
48	Stoma	"	No	0	"	"	No	0	Active	25 "
43	"	"	Yes	0	"	"	Yes	10-25%	"	10 "
41	Duodenum	Yes	"	10%	"	"	"	20-100%	Sluggish	20 "
27	"	No	"	0	"	"	"	35%	"	27 "
31	Stoma	"	"	0	"	"	"	0	Active	-17 "
30	Duodenum	"	"	0	"	"	"	50%	"	7 "
29	"	"	"	30%	Hyperactive	"	"	100%	Sluggish	8 "
48	Gastric & Duodenum*	Yes	"	10%	Active	"	"	0	Active	10 "

Table 2

the stomach in 13 patients. Six-hour retention of from 5 to 30 per cent of the barium occurred in 5 patients. After vagotomy a delay in the emptying of the stomach occurred in all but 4 of the patients. Retention during examinations made 1 to 3 weeks after vagotomy varied from 5 to 100 per cent and was often over 50 per cent. Delayed emptying at 4 to 6 hours during

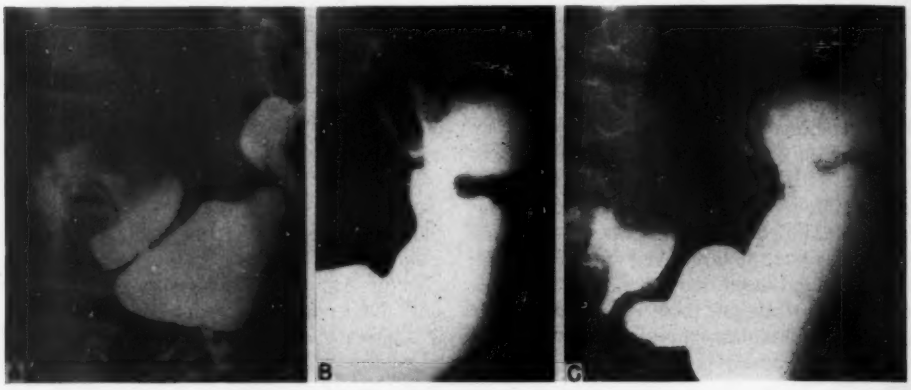

Fig. 2

The ulcer crater of the lesser curvature associated with an ulcer deformity in duodenum, A, has decreased in size seven days after vagotomy, B, and disappeared eighty nine days after operation, C. Healing of the ulcer of the lesser curvature has left a deformity. The possibility of malignancy has not been entirely eliminated.

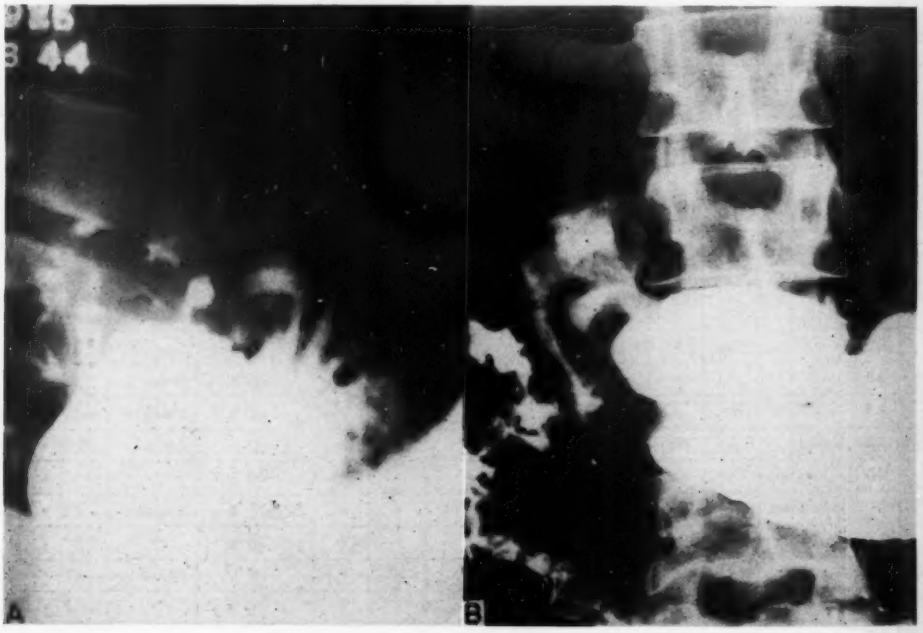

Fig. 3

The ulcer crater and spasm of the duodenum demonstrated by barium meal and x-ray before operation, A, have disappeared ten days after vagotomy, B.

examinations made 3 months or one year after vagotomy was often equal to that during the first 1 to 3 weeks unless a gastro-enterostomy was performed. Emptying of the stomach was usually complete 24 hours after the barium was given. Peristalsis as reported during routine fluoroscopy before vagotomy was considered hyperactive in 2 patients, active in 15, and sluggish in 1. Peristaltic activity during the first three weeks after vagotomy was described in routine reports by several fluoroscopists as active in 8, sluggish in 8 and absent in 1. Three months to one year after vagotomy there had been no significant change in the degree of peristaltic activity of the barium-filled stomachs. Fluoroscopy 1 to 3 weeks after vagotomy revealed that four stomachs had enlarged two to four times their original size. Two stomachs had somewhat decreased in size and the remainder were essentially unchanged. Three months or more after vagotomy three stomachs were somewhat larger than before operation and three somewhat smaller.

Information concerning motor activity of the fasting stomach has been obtained by introducing an elastic balloon, inflating it with 300 c. c. of air, and recording changes of intragastric pressure by a bromoform manometer. Examinations were made before operation and repeated 1 to 3 weeks, and again 3 to 15 months after operation in ten patients. Pressure changes recorded by the bromoform manometer have been changed for convenience into equivalent pressures in terms of cm. of water. Even though the patients were reclining and in a dark, quiet room, all preoperative recordings revealed marked stomach motor activity. The average amplitude of wave-like fluctuations of total intragastric pressure before operation was 14.5 cm. of water. One to 3 weeks after operation the amplitude was reduced to 0.9 cm. Three to 15 months later some return of motor function of the fasting stomach occurred in all pa-

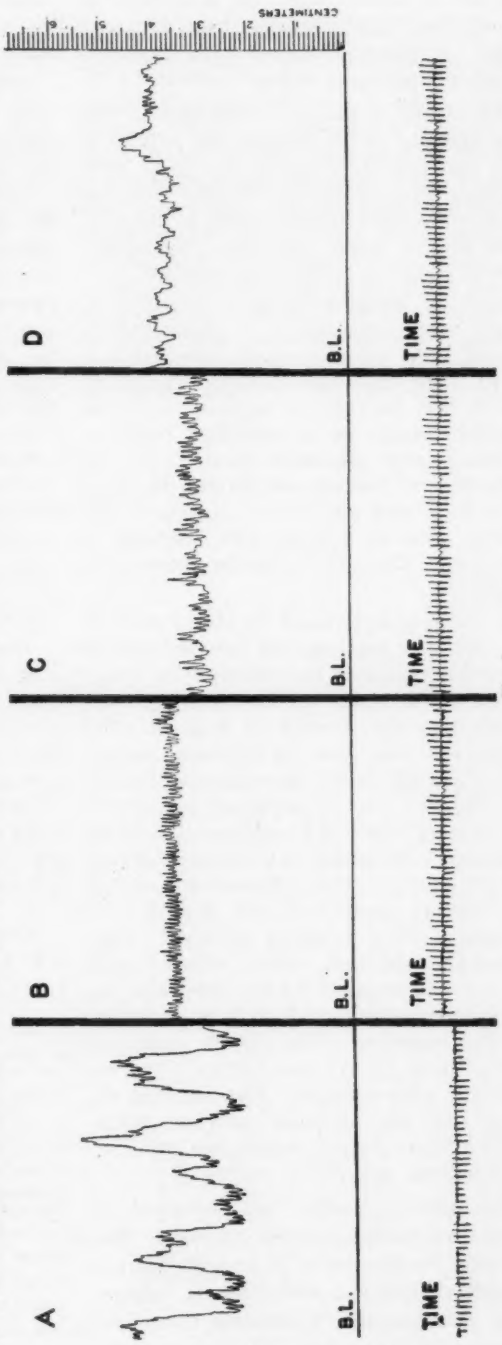

Fig. 4

Recordings of fluctuations of intragastric pressure demonstrate hyperactivity before vagotomy, A, and afterwards hypo-activity at 10 days, B, 98 days, C, and 462 days, D. There is some degree of recovery of motor activity in C and D. Tone has somewhat increased after vagotomy. Bromoform is used in the manometer. Time is in minutes. Base line is indicated by B. L.

tients and the average amplitude was 3.0 cm. of water. A typical response is demonstrated by tracings of a patient in *Fig. 4.*

Seven of the 10 patients complained of pain before operation as the stomach was inflated or during contractions. Pain did not occur after vagotomy. Five of the 10 patients exhibited increased tone after sudden stretch by inflation of the balloon before operation. No patient exhibited a stretch reflex after vagotomy.

Changes of intragastric tone as measured by the manometer connected to an elastic balloon distended with 300 c. c. of air were less pronounced. The experimental technic employed was such that the pressure required to distend the balloon could not be separated from the additional pressure exerted by the stomach. The average sum of balloon and intragastric pressures in 10 patients was 13.8 cm. of water before vagotomy. One to 3 weeks after operation it was 16.2 cm. Three to 15 months afterward it was 18.6 cm.

The volume of secretion of the fasting stomach before and after vagotomy has been determined by a method similar to that described by Dragstedt. A Levine tube was introduced through the nose into the stomach at 8 p. m. The stomach was evacuated. Continuous suction was then applied during the night and until 8 a. m. Gastric secretion aspirated during the twelve evening, night and early morning hours was measured. Altogether 121 tests were carried out in 17 patients. The aspiration volumes of the 17 patients ranged from 300 to 2,200 c. c. and averaged 946 c. c. before vagotomy. After vagotomy the aspiration volumes ranged from 8 to 750 c. c. and averaged 342 c. c. Eleven of the 17 patients exceeded one liter in at least one test before vagotomy. The average aspiration volume of these patients was 1,075 c. c. before and 364 c. c. after vagotomy. The remaining six patients were less abundant secretors before vagotomy. Their average volume was 648 c. c. before operation and 193 c. c. after it.

Gastroscopic examination was performed on seven patients before and after vagotomy. The preoperative examination in six patients was not remarkable. Hyperemia of the mucosa, enlargement of the rugae, and "cobblestone formation" was observed in the seventh. All seven stomachs appeared normal after vagotomy except that thick and inspissated mucus was present in two.

It is evident that the above observations have been uniform. The effect of vagotomy upon acidity of gastric juice has been remarkable but less consistent.

Altogether 125 determinations of acidity of the fasting stomach have been performed on 17 patients. Serial determinations of pH and of free and total acid were performed on individual patients before vagotomy and also 3 weeks and 3 months or more after vagotomy. The values for pH and free acid are averaged for the individual patient and are shown in *Fig. 5.* The pH was determined by the glass electrode. Free acid is reported as milliliters of one-tenth normal hydrochloric acid per 100 milliliters of gastric juice. There was a marked reduction in acidity in 11 of the 17 patients. Six of the 17 patients had only a moderate reduction in acidity. These 6 patients were among those who had the greatest delay of emptying time and retention.

The average change of pH, free acid, total acid, and combined acid for these two groups of patients is shown in *Table 3.* Both the 11 patients with marked reduction of acidity and the 6 with moderate reduction had similar increases in the amounts of combined acid after vagotomy. The six patients with retention had a greater reduction in acidity several months after operation than was evident during the first few weeks.

ACIDITY OF SECRETIONS OF FASTING STOMACH

	Before Vagotomy	After Vagotomy (3 weeks)	After Vagotomy (3 months)
11 patients with least retention			
Average pH	1.7	4.1	4.5
Average free acid	40 ml.	0 ml.	2 ml.
Average total acid	57 ml.	32 ml.	25 ml.
Average combined acid	17 ml.	32 ml.	23 ml.
6 patients with greatest retention			
Average pH	1.5	2.1	2.6
Average free acid	46 ml.	22 ml.	16 ml.
Average total acid	61 ml.	53 ml.	39 ml.
Average combined acid	15 ml.	33 ml.	23 ml.

Table 3

Our observations of the effect of histamine and of insulin hypoglycemia upon acidity of secretions of the stomach differ from those reported in the literature. Samples of gastric secretion for the histamine test were obtained from the fasting stomach before and one-half to three-quarters of an hour after the hypodermic injection of 0.4 mgm. of histamine solution. Tests were performed before, several weeks and several months after vagotomy on 13 patients. These values are shown in *Table 4*.

Before vagotomy patients responded to histamine stimulation in the usual manner. After vagotomy the response to histamine is in general lowered. The data in *Table 4* demonstrate that the reaction of individual patients to the histamine test after vagotomy has varied. In general there are two types of response. Nine of the 13 patients show a diminished response to histamine in the first several weeks after vagotomy. These are patients 1-9 inclusive. Patients 10-13 inclusive responded to histamine after vagotomy more normally. These 4 patients were among those with rather marked delay of emptying and retention. Of these patients, 9 and 13 show a variation. Patient 9 after having a response of 0 ml. to 15 ml. of free acid at 10 days and 0 ml. to 16 ml. at 3 months after operation, later developed an acute upper respiratory infection and with it a delayed emptying of the stomach. His histamine test then

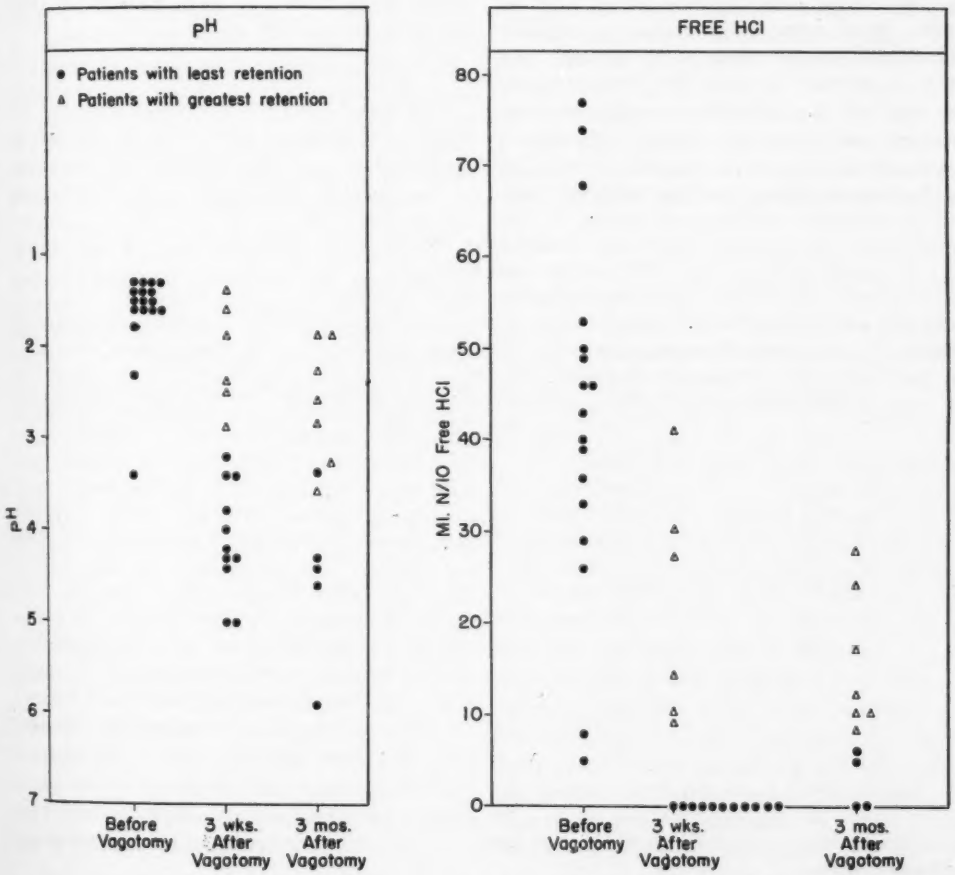

Fig. 5

produced a stimulation of from 0 ml. to 64 ml. free acid. Patient 13 had an obstruction and retention immediately after operation with a histamine effect of from 57 ml. to 100 ml. Three months after operation the retention had decreased and the histamine response was from 0 to 5 ml. In these 4 patients the total acid and combined acid values increased above their preoperative value. In the 9 patients with a less acid response to histamine the average total acid decreased and the combined acid was not significantly altered.

The insulin hypoglycemia test was performed after a 12 hour fast in 14 patients. Aspirations of gastric juice were begun at 10 or 15 minute intervals and continued three to five hours after the intravenous administration of 15 units of insulin. Blood sugar levels one-half to one hour after insulin ranged from 30 to 63 mgm. per 100 c. c., average 50 mgm. The changes in the free acid of the aspiration samples were determined and compared. Before vagotomy a temporary decrease in the amount of free acid usually occurred during the first thirty to forty-five minutes. Following this and usually within the next hour the maximum increase in free acid occurred. This maximum value ranged from 60 ml. in two patients to 145 ml. and averaged 88 ml. Insulin hypoglycemia tests were performed on ten of the patients during the first three weeks after vagotomy. Five did not develop free acid. Acidity in the remaining five appeared later than two hours after insulin. The maximum values ranged from 5 to 37 ml. with an average of 20 ml. Tests were performed on 12 patients three or more months after vagotomy. Two did not develop free acid. The maximum values of free acid in the remaining ten patients occurred between one and one-half hours and four and one-half hours after insulin. The maximum values ranged from 3 ml. to 67 ml. with an average of 26 ml. per 100 ml. of gastric juice.

SUMMARY AND DISCUSSION

This report does not attempt a complete review of the literature relative to the problem of clinical ulcer or to the functions and secretions of the stomach. Important early physiological

HISTAMINE TEST

Free Hydrochloric Acid

Ml. N/10 Acid/100 ml. gastric secretion

Patient No.	Before Vagotomy		After Vagotomy (3 weeks)		After Vagotomy (3 months)	
—	Before Histamine	After Histamine	Before Histamine	After Histamine	Before Histamine	After Histamine
1	27	35	0	12	0	14
2	35	78	0	0	0	0
3	0	25	—	—	0	0
4	33	54	0	38	5	14
5	32	38	0	3	—	—
6	54	84	0	25	0	22
7	0	31	—	—	6	6
8	20	96	18	32	—	—
					0	16
9	0	44	0	15	0**	64**
10	0	8	—	—	30*	78*
11	0	76	0*	40*	14*	46*
12	11	28	22*	51*	16*	33*
13	55	81	37*	100*	0	5

*Indicates retention.

**Indicates retention 15 months after vagotomy.

Table 4

contributions were made by Carlson,[11] Bulatao and Carlson,[12] Okada, Kuramochi, Tsukahara, and Oornoue,[13] Hartzell,[14] and others. Recent physiological and clinical studies have been reviewed by the authors of references 1 through 10.

A summary and discussion of the clinical and physiological observations made during the last nineteen months upon twenty-five patients with peptic ulcer will be undertaken. Since vagotomy has been employed in only a relatively small group of patients who have been followed less than three years no comparison can now be made between subtotal gastric resection and vagotomy as treatments for peptic ulcer.

The clinical effect of vagotomy has been encouraging. Patients are exceptionally well pleased, eat normal diets, are relieved of symptoms of ulcer, and gain weight. Their appetites are improved. All ulcers have evidently healed and there is as yet no evidence of recurrence. Complications related to the marked decrease of gastric motility and the presence of inflammatory or scar tissue about the ulcer site have occurred. Two patients had acute dilatation of the stomach and required aspiration of 1,700 and 4,500 c. c. respectively. Five of the twenty-five patients required some form of gastro-enterostomy either at the time of the vagotomy or later. Finney pyloroplasty was employed three times and gastrojejunostomy twice. The pyloroplasties worked better than the gastro-enterostomies, which, because of the decreased motility of the stomach, functioned poorly during the first week or two after operation. During the first several weeks or months after vagotomy half of the patients experienced epigastric distention after eating. Numerous drugs were employed to aid motility or emptying of the stomach without success. It was determined that patients could often manually empty the stomach during this period by upper abdominal massage. Even though varying degrees of distention occurred patients seldom vomited. Diarrhea developed temporarily in two patients. All patients developed temporary intercostal pain even though the intercostal nerve at the site of the incision had been evulsed during operation. Vagotomy has been most gratifying in patients with stoma ulcer.

The physiological changes induced by vagotomy have been remarkable. Motility or peristaltic activity of the fasting stomach as judged by balloon studies has been consistently decreased below normal and in some patients temporarily abolished. In spite of this, appetite and hunger sensations were normal or increased. Some recovery of motility was evident in balloon studies made 3 months and 1 year after operation. Ulcer pain was relieved by the time the patient waked from anesthesia. This relief may be related to division of some of the pain pathways from the stomach, to cessation of peristalsis or spasm, or to decrease adicity. The tone of the stomach as judged by balloon studies was little changed or slightly increased.

After vagotomy x-ray studies of the stomach filled by barium have revealed a delay in emptying and in most patients retention of some barium four or six hours or longer. Even though this retention was evident by x-ray these patients usually gained weight and ate regular meals without difficulty. Retention was also present in a reduced amount during x-ray examinations made three months or a year or more after vagotomy in those patients who had not had a gastro-enterostomy. Peristalsis of the stomach filled with barium was usually much less active after vagotomy than before it, particularly during the first several weeks. Considerable enlargement of the barium-filled stomach occurred in four patients. Decreased peristalsis and retention in the others was associated with little change in size or some decrease.

The volume of secretion of the fasting stomach was consistently reduced. Certain patients experiencing retention symptoms were therefore advised to take larger amounts of water or liquids with meals. This seemed helpful. The acidity of the secretion of the fasting stomach has also been markedly reduced. Although the pH and the free and total acid of secretions of the fasting stomach are much less acid after vagotomy than they were before operation, the values for combined acid are greater. This would seem to indicate that vagotomy not only reduces the amount of acid secreted by the stomach but also facilitates neutralization of acid. Mucus, swallowed saliva, or regurgitated duodenal content and bile might better neutralize the smaller

volume and concentration of acid present after vagotomy. Also peristaltic activity of the esophagus and duodenum is not significantly altered by vagotomy. With the motility of the stomach decreased, activity of the duodenum might regurgitate more of its alkaline juices than normally occurs. Bile was seen more frequently in aspiration specimens after vagotomy than before operation. It is therefore of interest that the decrease of acidity of the fasting stomach was least in five of the patients with the greatest obstruction and retention.

The information available in the literature and the observations of Dragstedt indicate that vagotomy should not alter the increase of acidity of secretions of the stomach produced by histamine but should abolish the acid response produced by insulin hypoglycemia. Our observations have been somewhat different. The free acid produced after vagotomy by 0.4 mgm. of histamine in nine of the 13 patients studied averaged 14 ml. which is considerably less than normal. In four patients who had rather marked obstruction and retention the response was more normal averaging 52 ml. In two patients the degree of obstruction changed and it was evident that the histamine response was high only during the period of obstruction. This difference cannot be readily explained by neutralization since histamine after vagotomy did not produce a significant change in the amount of combined acid.

The insulin hypoglycemia test produced marked hypersecretion before vagotomy. Within several weeks after operation the test produced no free acid in five patients and small amounts not exceeding 37 ml. in another five. Twelve patients were tested later than 3 months after operation. Two did not develop free acid and ten developed free acid ranging from 3 to 67 ml., average 26 ml.

It is of interest that Bulatao and Carlson[12] and others have demonstrated that insulin hypoglycemia in patients with intact vagus nerves also produces changes of motility with increase of gastric tonus and hunger contractions. The exact relationship between the motility of the stomach and the secretion of acid by the stomach in response to chemical or nervous stimuli is not known. Most secretory stimuli normally produce acid secretion and also increased gastric motility. The marked decrease in motility after vagotomy may be a factor that alters the secretory response to such different agents as histamine and insulin.

The results of the studies reported above have indicated that although vagotomy should block the neurogenic, psychogenic, or reflex gastric secretory mechanism in patients, it may also have a broader effect and somewhat alter the endocrine or chemical secretory mechanism or facilitate neutralization of the free acid that it produces. The observations also indicate that although changes in secretion and acidity are important, the most pronounced and consistent change produced by vagotomy is a decrease of the motility of the stomach. Since the decrease of acidity was least in five of those patients who had the most obstruction by scar tissue and the greatest delay of emptying of the stomach, it seems probable that vagotomy should often be combined with pyloroplasty or gastrojejunostomy if the maximum benefit is to be obtained.

CONCLUSION

Transthoracic vagotomy has been an effective treatment for refractory peptic ulcer in 25 patients during a short period of observation of from one to eighteen months. It has been combined with pyloroplasty or gastrojejunostomy in five of the patients because of obstruction and retention. Vagotomy decreases the motility of the fasting and of the barium-filled stomach and decreases the volume and acidity of the secretion of the fasting stomach.

Acknowledgment is expressed to Dr. J. M. Ruffin, Dr. G. J. Baylin, and Dr. F. H. Hesser for their cooperation in this study.

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DISCUSSION (*Abstract*)

Dr. Max M. Zinninger, Cincinnati, Ohio.—This is a new treatment for gastric and duodenal ulcer and, as you see, the results reported have been quite impressive.

This method is still to be regarded as an experimental approach to the problem, an approach which is directed to the physiologic side, and it may or may not prove to be as successful as it appears to be in these earlier reports.

Dr. Grimson has made very moderate claims of what can be expected from this procedure, and he has pointed out some of the difficulties such as the delayed emptying time of the stomach.

It seems to me that methods such as this should be continued in large centers where some one is interested in the problem, where he is willing to study his cases carefully, as Dr. Grimson has done, and is able to report back at some subsequent time, maybe two, maybe three, maybe five years from now, as to what has happened to the patients.

I do not believe the operation should be undertaken by individuals who are not in position to accumulate large groups of cases, and to have accurate follow-up records.

I should also like to call to your attention the fact that interruption of sympathetic and parasympathetic fibers is not always attended by long range good results. The immediate results may be very desirable and very dramatic, but after a period of months or years, the old condition which prevailed before interruption of sympathetic and parasympathetic fibers, returns. This may be due to incomplete division; it may be due to regeneration of fibers; it may be due to the fact that the organ which was deprived of its sympathetic innervation, regained some new type of innervation, or develops and becomes more or less autonomous. For that reason I think it is particularly important that a method such as this be subject to very critical analysis over a considerable period of time.

I therefore would like to repeat what I said earlier, that this is not a method which is to be used by individual surgeons but should be restricted to centers where large groups of cases that are carefully studied, can be analyzed; and reservation of judgment should be awaited until good reports are available at intervals of three, four, or five years after the procedure. Then we will know what can be expected of such an operation.

Dr. R. L. Sanders, Memphis, Tenn.—This presentation brings to mind the studies of Dragstedt, with whom the essayist was associated before going to his present location. From their experiences, vagotomy seems to offer a happy solution to some of the problems of peptic ulcer control. For many years, physicians and surgeons alike have been wandering through a wilderness, so to speak, seeking new methods of management of this disease. They have utilized every means available, yet surgical complications still arise in almost 30 per cent of the cases. If vagotomy can obviate the necessity for some of these surgical attacks upon the stomach, with all their devastating effects it will be a welcome addition to our present methods of treatment.

I am sure, however, that Dr. Grimson does not advocate vagotomy as a cure-all. There are certain types of peptic ulcers for which only surgery will suffice. First, are the acute perforating ulcers; unfortunately, these present no alternative to operation. Again, the chronic cicatrizing ulcer with pyloric obstruction must be attacked surgically in order to save the patient from starvation. Nor am I at all convinced that simple vagotomy will cure a bleeding ulcer after it has perforated into the pancreas, particularly if the perforation involves the pancreaticoduodenal artery and a fatal hemorrhage is about to ensue. Subtotal gastrectomy is the treatment of choice in such cases, and in the hands of well trained surgeons, gives excellent results with a low mortality. In my own experience, subtotal gastrectomy has brought relief in 85 per cent, and the mortality has been approximately 3 per cent. Gastroenterostomy, also, still serves a good purpose when resection is not feasible.

In the treatment of patients with non-obstructing, intractable ulcers, on the other hand, vagotomy holds a bright prospect. In one form or another, this method has been employed for a long time. A few surgeons routinely sever the fibers of the vagus nerve below the diaphragm in performing subtotal gastrectomy, and by so doing succeed in controlling the acid factor to a considerable extent. Dr. Albert Berg, of New York, has done some notable work along this line. Likewise, many of you will recall that, several years ago, Dr. Crile attacked the problem from another angle, namely, denervation of the suprarenals. This operation was received with enthusiasm, but ultimately proved ineffectual and was abandoned. The same thing may be said of many other operations designed primarily to interfere with nerve impulses. For example, presacral nerve resection for dysmenorrhea and allied pelvic disturbances was at first most promising, though time and experience have proved its limitations. I therefore think we should wait to see whether vagotomy is the solution

to our difficulties with intractable ulcers. If so, no one will accept it more gladly than I. Dr. Grimson and his associates are to be congratulated upon their success thus far, and I am pleased to be first to wish them Godspeed in their further efforts.

Dr. A. J. Carlson, Dayton, Ohio.—There is a point which should be brought out in the discussion and which I believe has not been sufficiently emphasized. This operation should not be done for the treatment of gastric ulcer because of the high incidence of gastric carcinoma and the inability definitely to differentiate these two conditions.

I have performed one of these operations and found it very simple so far as the technic is concerned. As Dr. Claggett has said, the morbidity and mortality incident to entering the chest are no greater than those from entering the abdomen. In my case there was a complication which has not been mentioned, a temporary stenosis of the esophagus at the level of the resection. I wonder if Dr. Grimson has encountered that condition.

Question.—Without attempting to discuss this paper, as I have had no experience with this particular operation, I want to ask a question as to what effect, if any, vagotomy has on the heart. It struck me that that would be one of the organs that we should watch after working with a vagus nerve.

Dr. William F. Rienhoff, Jr., Baltimore, Md.—A number of years ago when I did denervation of the lung for asthma which procedures have been reported in the *Archives of Surgery* (September 1938), and the *Bulletin of the Johns Hopkins Hospital*, April 1942, we were impressed by the frequent anastomoses between the parasympathetic fibers of the vagus nerve and the sympathetic trunk beginning in the neck and extending all the way down to celiac plexus. Some fibers of the vagus would descend into the sympathetic trunk from above the cardiac plexus, then descend into the sympathetic trunk and would pass through the celiac plexus into the stomach as parasympathetic fibers along with sympathetic fibers. I made a very careful study of the anatomical and physiological literature on the sympathetic and parasympathetic trunks. There has been no conclusive work to demonstrate the extent of the interchange of fibers between these two systems, nor the level in the cervical or thoracic regions at which these intermixtures of fibers occur. Thus one cannot be certain that cutting the vagus nerve just above the diaphragm interrupts all the parasympathetic fibers.

In addition to this characteristic, surgical procedures which are directed to the cure of the complications of peptic ulcers of the duodenum should only be employed, in my opinion, for definite complication. The presence of a peptic ulcer in the duodenum which is uncomplicated should not necessarily be the object of surgical attack. The majority of these are cured by medicinal measures. When the ulcer has perforated through the mucosa into the head of the pancreas causing severe hemorrhage, not infrequently catastrophic hemorrhage; when the ulcer has penetrated the mucosa into the muscular coat and threatens perforation of the duodenum anteriorly into the general peritoneal cavity; when the ulcer by virtue of healing has caused cicatricial stenosis of the pylorus, it seems to me illogical to go above the diaphragm through the chest transthoracically and cut the vagus nerve for such complications. Furthermore, if the abdomen is not opened and the vagi cut how can one be sure that one has a peptic ulcer of the duodenum? Finally, I feel that peptic ulcers of the stomach should be excised to prevent any possible malignant change.

Dr. Grimson's paper is extremely interesting. This work is certainly in the experimental state and should be pursued. It might be that this operation, vagotomy, is the ideal one to prevent the complication of peptic ulcer of the stomach and duodenum, but certainly unless these complications have occurred, I am not so certain that this operation is the one of choice.

Dr. Grimson (closing).—The relationship between vagotomy and the function of the heart is not easily determined. Resection of the nerves just above the diaphragm should not disturb the known cardiac innervation. It is possible that adverse sensory or reflex influences from the abdomen might be blocked.

Stenosis or obstruction of the esophagus at the site of operation has not occurred. Dr. Dragstedt has cautioned that his operative technic of transplanting rather than resecting the vagus may obstruct the esophagus if the nerves be swung in front of rather than in back of this structure. Our efforts to prevent regeneration have led to extensive resection rather than transplantation of the nerves and have thus avoided this possible complication.

The exact mechanism by which the vagus nerves influence the secretion of acid from the glands of the fundus of the stomach is not known. The mechanism by which stomach motility is achieved is also not entirely known. The purpose of this clinical study is to obtain if possible more information concerning the innervation and the physiology of the stomach.

The interest of the discussors in this subject is appreciated. The reservations expressed are correct. Vagotomy is at present an investigative procedure. If the course of the patients over many years yields as much encouragement as at present vagotomy may ultimately play a role along with other surgical procedures in the treatment of refractory ulcers. It is a physiological treatment and cannot be expected to relieve scar tissue obstruction or organic obstruction. At present obstructed patients are being treated by some form of gastroenterostomy and immediate or, if indicated, late vagotomy. Extremely careful clinical judgment is necessary that ulcers undergoing malignant degeneration not be treated by vagotomy.

THE USE OF PERFORATED ACRYLIC IMPLANTS FOLLOWING ENUCLEATION*

By GEORGE M. HAIK, M.D.†
New Orleans, Louisiana

In spite of technical and other advances which permit the conservation of the eye in many injuries in which prompt removal would formerly have been necessary, enucleation is still the only feasible procedure in a certain proportion of cases. It is also the required procedure in another, smaller group in which the removal of an injured eye is necessary to save the sight in the uninjured eye. The operation itself is simple. The accomplishment of good cosmetic results is quite another matter and is tremendously important in an economic and psychologic sense to the unfortunate victim; a one-eyed man labors under a disadvantage with other people in business, and it is therefore of vital importance to bring back as nearly as possible a normal and pleasing appearance.

It is generally agreed that the fitting of a satisfactory artificial eye depends upon the preliminary use of an implant, preferably at the time the enucleation is done. Until quite recently these implants were made of fat, cartilage, bone, celluloid, gold, or glass, the latter variety being the most widely used. Although many observers have expressed satisfaction with their use, my experiences in hospital and private practice left me with the feeling that they did not answer the purposes for which they were intended, namely: to render the wearer of an artificial eye as inconspicuous as possible.

As a substitute for the implants previously used an attempt was made to develop an acrylic implant. Acrylic, which is a plastic material widely used for dentures, is light in weight, tough, not affected by changes of temperature, and with negligible properties of water absorption.

The first attempt, while the 64th General Hospital was still in Africa, produced a round implant, 15 to 17 mm. in diameter. In the majority of cases in which it was used, the immediate cosmetic results were good and free movement of the prosthesis fitted later proved to be possible.

When the hospital was moved to Italy and was made an eye center, it was provided with half the prostheses available in the theater. This gave us an opportunity to study approximately one hundred and fifty enucleations, some per-

Fig. 1
Determination of size of acrylic implant by fitting it into Tenon's capsule.

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*From the 64th General Hospital.

*Sgt. Louis Sadecky furnished valuable technical assistance in this work.

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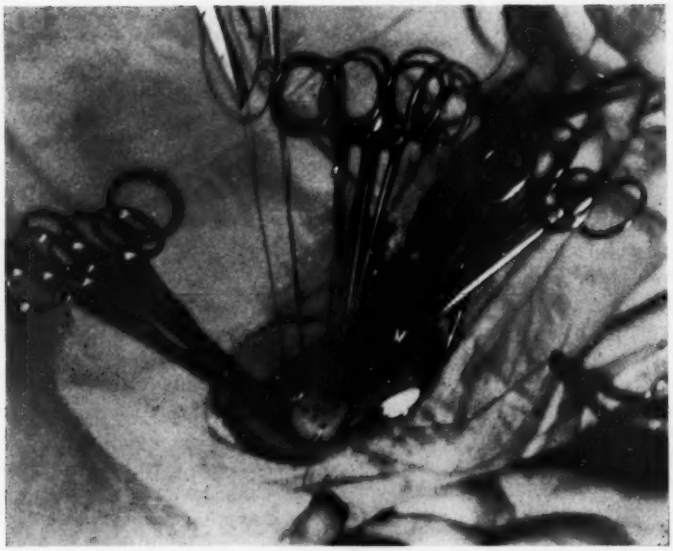

Fig. 2
Placing of sutures through perforations in acrylic implant.

Fig. 3
Acrylic implant in place, with sutures placed through perforations in implant and through conjunctiva and Tenon's capsule, before closure of Tenon's capsule and conjunctiva.

Fig. 4
Perforated acrylic implant, anterior aspect.

Fig. 5
Perforated acrylic implant, lateral aspect.

Fig. 6
Perforated acrylic implant anterior-lateral aspect.

formed several years previously, some performed recently, and some performed currently in the eye center. The patients were American, British, and French troops, and Italian and German prisoners of war. It was thus possible to determine both the immediate and the late results of various types of implants and certain conclusions were formulated:

(1) An implant is always necessary if a good cosmetic result is to be achieved. Unless it is used, there is always more or less sinking of the upper lid, even if the operation has been properly done and the artificial eye fits perfectly. The deformity is naturally greater if the operation is improperly done and if the fat of the orbit has been disturbed.

(2) An operation which leaves a flat or slightly cupped stump, with the muscles intact, usually terminates in a satisfactory cosmetic result; an operation which leaves a deep socket seldom achieves a good cosmetic result.

(3) Sockets differ in shape and size, both naturally and as a result of operative procedures, and proper fitting of the implant is an absolute necessity.

(4) Too small an implant is undesirable; it leaves too deep a socket and has a tendency to migrate through openings in Tenon's capsule.

(5) Too large an implant is equally unsatisfactory. It restricts motion; it gives the upper lid a ptotic appearance with late atrophy is a frequent consequence; it leaves little room for prosthesis. Under such circumstances, a shell eye must be used, which is never so comfortable as a reform eye with its rounded edges.

(6) Round implants tend to migrate toward the nose, toward the temples, or downward, and fitting of an artificial eye is correspondingly difficult and unsatisfactory.

(7) Round implants formerly used are particularly unsatisfactory when Tenon's capsule has been injured or accidentally torn. Migration in such cases is the rule.

To meet these various objections, a roughly pyramidal-shaped acrylic implant was eventually devised (*Figs. 1-3*). It measures 17 by 18 by 12 mm. On the center of the horizontal surface are three vertical lines of perforations, each line consisting of three or four perforations. An implant of this shape, made in various sizes, was found to be suitable for all types of sockets because it could be fastened in position at the time of the enucleation and thus could not migrate through Tenon's capsule or in any other direction. It was hoped, and later events proved the soundness of the speculation, that fibrous tissue would eventually grow through the perforations and hold the implant permanently in position.

The technic of application is simple. The usual enucleation operation is performed under whatever anesthesia is preferable. The internal and external rectus muscles are preserved, and special care is taken to remain as far as possible within the limits of Tenon's capsule and to leave intact the fat of the orbit. After the eye has been removed, an implant of the proper size is placed in Tenon's capsule. Two or more sutures of black silk (No. 0000) are passed through the upper aspect of the conjunctiva, Tenon's capsule, the two upper perforations of the implant (*Figs. 4-6*), and the upper portion of Tenon's capsule and the conjunctiva. These sutures are not tied. Tenon's capsule is then closed with interrupted sutures of No. 0000 catgut. The external and internal rectus muscles are approximated with the same material. The superior rectus is not sutured, it being thought that suture of this muscle might be one of the reasons for ptosis with a prosthesis. The conjunctiva is closed with interrupted sutures of No. 0000 black silk, and, finally, the sutures placed previously in the implant are tied over the conjunctival layer.

SUMMARY

A perforated acrylic implant is described which it is believed fulfils the criteria arrived at for implants after a study of a number of enucleations in civilian life and of 150 observed during two years overseas as chief of an ophthalmic center.

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FAILURE OF LIPID METABOLISM: PROCTOLOGIC SIGNIFICANCE*

By MARK M. MARKS, M.D.
Kansas City, Missouri

Septic and proctologic surgery are usually combined in one service in a military hospital. Thus a military proctologist sees chronic suppurative lesions involving not only the perianal region but other areas of the skin. Of patients admitted to this service, 20 per cent are acneic. The variations and complications of this disease produce considerable morbidity. There exists a constancy of symptomatology of acneic pyodermas without regard to their particular locale, which indicates the interrelationship of such diseases which have been thought to be separate entities.

The two components of the skin primarily involved are the sebaceous and apocrine glands, either singly or together, to produce characteristic lesions. Acne of the sebaceous glands has special predilection for the face, postauricular region (*Fig. 1*), neck (*Fig. 2*), shoulders (*Fig. 3*), back (*Fig. 4*), buttocks (*Fig. 5*), and chest. The extremities are less often involved. Lesions range from minute, acute, superficial pustules to chronic, painful, massive, granulomatous, nodules which lie in and beneath the skin, and from which drain foul caseous material. Acne in its simple form is little more than a nuisance, but chronic and severe variants are accompanied by painful cellulitis, irreversible and destructive changes in the cutaneous and subcutaneous tissues, and the production of keloidal masses and cavities lined with a sebumsecreting and suppurative membrane (*Fig. 6*).

The apocrine glands of the skin are those of scent. They are found in the axillae, groin and perianal region. When these become inflamed, extension to adjacent tissue is common. The resultant lesions are chronic, painful sinuses.

In the axilla the disease has been called hydradenitis suppurative. Because of anatomical relations and movements of the tissues, abscesses develop that may extend beneath the scapula.

Perianal involvement includes both sebaceous and apocrine inflammation. There may occur simply isolated sebaceous cysts or comedones, or chronic, painful, boggy, firm granulomas extending beneath the skin and exuding purulent material from multiple sinuses (*Fig. 7*). This form of acne has often been described as perianal pyoderma. Extension of the disease occurs by obstruction of drainage followed by secondary abscess formation and reformation of a pyogenic membrane.

Circumscribed lesions of the same kind may bilaterally overlie the ischii, and are commonly called "saddle sores" (*Fig. 8*). In the groin similar fibrotic tracts may exist. All such encysted acneic tracts are lined with granulation tissue containing giant cells and often droplets of lipoid material.

The clinical picture follows a constant pattern. The patients are asthenic and underweight, yet do not gain weight readily. They complain of chronic fatigue which no amount of rest seems to rectify. Their sores, which may be restricted to one region or disseminated in all acne areas of the body, heal tediously and undergo frequent exacerbations with recrudescence of old lesions or the development of new ones. Morning temperatures are consistently subnormal, ranging as low as 96.6° F., and rarely reaching normal levels unless secondary infection interposes. The skin is sallow and excessively oily. The patients are susceptible to folliculitis and furunculosis. These heal slowly and tend to recur.

Acne is common in the age groups of military service, especially in the teens and early twenties. Because of the chronic fatigue of acneic individuals and their difficulty in gaining weight, they over-ingest foods which are rich in lipids, such as milk, milk products, chocolate, fried foods, and fat meats. The basal metabolic rates in these patients are usually in the lower brackets of normal or below. Laboratory findings confirm the presence of hypothyroidism, already manifested symptomatically by low morning temperatures, as described by Broda Barnes,[1] who used this measurement as a check of basal metabolism. A constant feature of the acneic pyoderma here described was a hypercholesteremia, with titers ranging from 180 to

*Read in Section on Proctology, Southern Medical Association, Thirty-Eighth Annual Meeting, St. Louis, Missouri, November 13-16, 1944.

350 mg. per cent. It is believed that the diet offered by the army and the fatty foods selected by the patient combine in the presence of hypothyroidism to produce the disease, wherein sebaceous material accumulates in the glands of the skin and acts as a foreign body in the development of inflammation.

Local medication is of little value. Sunlight or ultraviolet light may be of benefit in associated staphylococcic infections. X-ray therapy has limited utility. Sinuses and oil cysts must be drained surgically in order to evert the sebaceous membrane and to prevent further extension. Small lesions can easily be excised. Since thyroid deficiency is manifested by low basal metabolic rate, low morning temperature, hypercholesteremia, and chronic fatigue, supplementary thyroid is given in sufficient quantity to produce clinical improvement. The dose is gauged by rise in the basal rate and in the morning temperature, as well as by subjective and objective response. The proper dose is a variable quantity, but more than 2 grains of thyroid U.S.P. daily in divided doses is rarely required. All patients are placed on low fat diets with adequate caloric intake of non-fatty foods. The purposes and methods of treatment are thoroughly explained to them; so that by co-operating they may adapt themselves as well as possible to their dietary opportunities.

Under this regime, there ensues rapid relief of pain and disappearance of acute inflammation of the skin, a decrease of oiliness and improvement of strength, physical capacity and sense of well being with a marked gain in weight. The exposed pyogenic membrane diminishes in size and finally becomes a scale which peels away, leaving a depressed scar.

In a previous report,[2] a case of long duration involving the face, neck, axillae, torso and perianal area responded rapidly to this prescribed treatment.

Cases of the disease which fail to respond satisfactorily to these efforts are the extreme and chronic ones which have apparently reached an irreversible stage and exhibit cystic lesions over the major portion of the torso. Cysts, sinuses and granulomas in these cases undergo further degeneration of the pyogenic membrane with the development of marked keloid forma-

Fig. 1 (Top) Acne vulgaris.
Fig. 2 (Center) Lesions of neck, seven years duration.
Fig. 3 (Bottom) Involving the shoulder.

tion and encapsulation of oil cysts. Such cases seem able to resorb the lipids in the skin and to deposit them into previously unaffected areas so as to provoke new crops of inflammatory lesions. Many patients have been so severely affected that full or limited service has been impossible. It is difficult to restrict or supervise the diet of soldiers in the field, and many severly acneic ones require separation from the service. Even cases of moderate acne, moderate by military rather than by civilian standards, should be placed on a limited status, for hot, wet climate and canned rations provoke incapacitating exacerbations.

In acneiform and staphylococcic lesions of the skin, such as carbuncles, furuncles and folliculitis, the increase of metabolism and skin temperature obtained by giving thyroid and by limiting the fat intake prove of considerable therapeutic value.

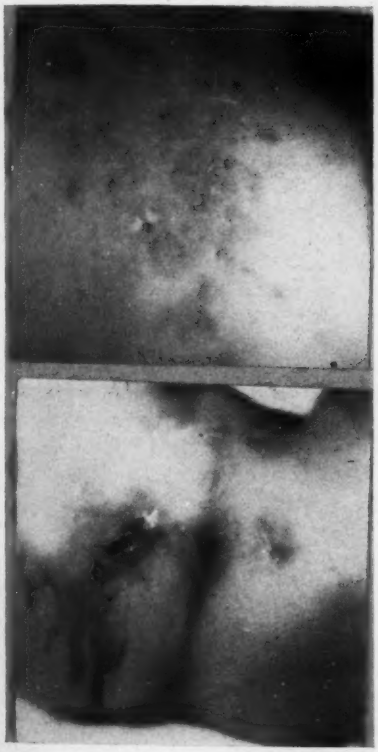

Fig. 4 (Top) Keloid formation with acute and chronic lesions.
Fig. 5 (Bottom) Perianal pyoderma, bilateral.

Fig. 6 (Top) Area of neck. Keloid formation with chronic drainage sinuses.
Fig. 7 (Center) Perianal pyoderma showing pyogenic membrane exposed.
Fig. 8 (Bottom) "Saddle sores."

CONCLUSION

Of cases admitted to the septic and proctologic section of the surgical service of an Army hospital, 20 per cent have entered for treatment of chronic suppurative lesions of the skin due to some form of acne. A constant clinical picture of inadequate thyroid activity and excessive ingestion of fats has been observed. Correction of diet, thyroid therapy, and adequate suitable surgical intervention are the therapeutic measures which have yielded success.

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DISCUSSION (*Abstract*)

Dr. Edward G. Martin, Detroit, Mich.—I have a very limited knowledge of this subject. It is of interest that the condition develops among those who are hypothyroid and, of course, the condition described must be of metabolic origin.

A patient awaits admittance to the hospital in Detroit now who in my opinion presents the characteristics described. Both buttocks, groins, perineum, scrotum, and suprapubic skin are involved by sinuses, scar tissue, moderately inflamed areas and very little discharge. This man has been operated upon by others eleven times. With adequate doses of thyroid extract and radical surgery, with the free use of the curette, and a follow-up by one of the sulfonamides or penicillin, I am encouraged to believe this man can be made well. I shall send Dr. Marks a report of this case with photographs later.

Dr. Curtice Rosser, Dallas, Tex.—Does Dr. Marks feel that these cases should not be drained surgically as well as handled from a medical standpoint?

Dr. Marks (closing).—If milk is required as a source of calcium, it should be skimmed. Buttermilk may also be used. Because the acneic individuals are chronically fatigued they abnormally consume excessive quantities of milk, cheese, salad oils, nuts, ice cream, and chocolate in the belief that their lack of energy is due to inadequate food intake. Since the offending foods are those rich in lipids, all must be restricted.

Adequate surgical drainage of infected cysts, abscesses, and sinuses is imperative to stop the extension of the processes. In those cases described as saddle sores and perianal pyoderma, the tracts are incised for maximum drainage and kept open by packing until the pyogenic membrane dries.

When the clinical picture is reviewed, it is obvious that one of the underlying defects is a hypothyroidism comparable to that of myxedema. By giving adequate amounts of thyroid, the skin temperature is raised, and there is a decrease in the blood cholesterol and oiliness of the skin indicating the lack of this glandular activity.

PRIMARY AND SECONDARY METASTASES FROM CANCER OF THE COLON AND RECTUM*

By WILLIAM H. DANIEL, M.D.
Los Angeles, California

Primary metastases are those which are discovered at operation or by pathological examination of the removed specimen. Secondary metastases are those which appear at a later date and are discovered by clinical or by postmortem examination. You are well acquainted with the classifications of Broder and Duke relative to the degree of malignancy and tumor spread and to other works regarding the migration of cancer cells via the lymphatics and veins and it will be unnecessary to refer to them in detail.

This resumé will be restricted to those cases examined and treated by the writer. The results of procedures carried out with radical removal of the tumor, although some of them were only palliative, will be discussed. These procedures are: (1) end-to-end resection with anastomosis; (2) the Mikulicz and anterior resection for cancer of the sigmoid and colon; (3) the abdominoperineal resection and the colostomy and perineal resection for cancer of the anus, rectum and rectosigmoid. Since there is no definite boundary between the rectum and rectosigmoid, the term "rectum" is used to designate these two areas. Cases which were treated only by palliative measures because of primary incurable metastases are not included although interesting facts of cancer spread were noted.

The total number of cases examined in this series was 1,040, of which 62 were Grade I or II malignant adenomas or polyps without involvement of the bowel wall, which were treated by the electric cautery or by dessication with only one known reappearance at the original site and no known metastases.

Of the 978 definite cancers, the majority of which were classified as Grade II or III by the pathologist, 286, or 29.07 per cent, were removed by one of the radical measures mentioned above. The remainder were inoperable,

*Read in Section on Proctology, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.

were treated palliatively or sought treatment elsewhere. There were 189 primary metastases in this group.

In 108, or 37.69 per cent, of the 286 radical procedures, primary metastases were demonstrated macroscopically or by the pathologist. In some instances there were multiple metastases making a total of 128. Thirty-eight, or 13.16 per cent, had metastases to the liver, lung and nodes in the upper abdomen which were obviously incurable. In 70, or 25.43 per cent, metastases to nodes were demonstrated within the limits of surgical removal and were considered curable. In 140, or 48.86 per cent, no spread was discovered. To this number were added the 70 in which cure was considered possible, totalling 210, or 69.29 per cent, with a chance of cure.

Secondary metastases occurred within five years in 65 cases, or 22.73 per cent, of the number having undergone radical operation. To this number (65) are added the primary incurable metastases, 38, the surgical deaths, 28, and those known to have died from other causes, 23, making a total of 154, or 53.45 per cent, not surviving the five years. Deducting these from the total, 46.45 per cent, should be considered to have outlived the five-year period. This will not hold true because many of these have been treated less than five years previously. In one group in which the follow-up records were fairly accurate, the five-year survival rate was approximately 35 per cent.

The ages of the patients are tabulated for brevity in two groups, 20 to 50, and 50 and over. In the first group there were 86, or 30 per cent, with a primary metastases rate of 47.36 per cent and a secondary rate of 41.76 per cent. In the second group of 200, primary metastases occurred in 83, or 41.55 per cent, and secondary in 21.58 per cent. The highest secondary rate, 46.44 per cent, occurred between the fortieth and forty-ninth year.

Not all of the tumors were graded by the pathologist. In the 20- to 50-year group, of those graded, 32 per cent were classified as Grade II and 68 per cent as Grade III. In the older group, 51 per cent were Grade II and 49 per cent Grade III. In the majority of the excised tumors an attempt was made to isolate and section the nodes. The number of nodes examined microscopically varied from 1 to 12. Involvement of nodes, or adjacent tissue, was found in 83 cases.

Primary metastases were multiple in many cases and involved the various organs as follows: vesicle and prostate 1, bladder 7, vagina 3, uterus 2, liver 29 and bone 1. Secondary metastases involved the operative wound in 22 instances, inguinal nodes in 2, abdomen in 42, liver in 7, lungs in 2, brain in 3 and bone in 1 instance. The ratio of nodes to secondary metastases was 70 to 65 with 79 metastases in the 65 patients. Secondary metastases appeared as follows: first year, 39.94 per cent; second year, 38.35 per cent; third year, 16.19 per cent and fourth year 4.7 per cent. There were no known metastases which appeared in the fifth year.

Of the operative procedures, there were 203 abdominoperineal resections with 57 secondary metastases, or 28.15 per cent. There were 54 colostomy and perineal resections with 12 secondary metastases, or 22.22 per cent. There were 29 resections of the colon with 8 metastases, or 27.52 per cent.

Metastases in the operative wound appeared in 22 cases and were associated with metastases in the abdomen in some instances; none of these has been cured by secondary operations. Symptoms of recurrence in the perineal wound are usually those of aches or pain which may be referred to the back or down the legs before any external evidence is demonstrated. In many cases a tenderness deep in the wound was noted before induration could be felt. In some of these, symptoms are caused by metastases low in the pelvis which were not evident upon perineal exploration. Vaginal examination in the female does not always reveal definite signs, although any slight thickening along the pelvic wall should be considered with suspicion. As the disease progresses the malignant tissue assumes a hard rubbery feeling, in some cases remaining rather flat and in others becoming nodular. In those cases in which abdominal exploration was done on clinical symptoms alone, metastases could not always be discovered although in most instances death was caused by definite metastases. Secondary involvement has been found generally in the lateral pelvic wall along the large vessels and ureters.

In secondary metastases of the upper ab-

domen, vague aches and pains with loss of appetite are the first complaints. In some cases the symptoms point to peptic ulcer or gallbladder disease and it has been necessary to do gastrointestinal studies in order to pacify the patient. In involvement of the upper abdominal nodes, jaundice has been present in some cases and lasted until death. Metastases in the liver may be manifested by diaphragmatic pain and irregular fever. In several cases there was a marked daily rise of fever for several weeks or months before the involvement of the liver was definitely determined. In one instance peritoneoscopy was employed and metastatic nodules were clearly seen covering both the upper and lower surfaces of the liver. Secondary metastases to the liver have been noted in which there was no evidence of cancer spread from the tumor itself. In one instance in a woman of 42 years, a cancer of the sigmoid was removed by the Mikulicz procedure. There was no spread found. A year later it was necessary that she undergo an operation for uterine fibroid at which time there was no evidence of abdominal or liver metastases. A year later she died from liver metastases.

Primary metastasis to the liver varies in the rate of growth following surgery. It has been said that removal of primary growths ordinarily retards growth in the liver. This has not been found true in the majority of cases in this series although one patient lived four years and another is now in his third year and apparently in good health. In a case of a small cancer of the sigmoid in a man of 58 years, three-fourths of the liver was involved and the patient lived over eleven months without removal of his original tumor. A woman of 48 with a small lesion in the liver died in less than eight months.

There have been two secondary metastases in the inguinal nodes, in one instance following a highly malignant anorectal lesion which later caused death and the other following an abdominoperineal resection for a primary adenocarcinoma in the rectosigmoid.

SUMMARY

A study of the foregoing figures warrants the conclusion that there is a definite relationship between primary and secondary metastases. Some cancer cells are carried by the lymphatics and some by the venous channels. It is to be considered that handling of the tumor may be a factor in the venous spread and in local and abdominal implantations. It is also evident that surgical procedures which have been thought to be the most ideal for removal of the tumor with its spread fall short of the desired results. Secondary metastases appear frequently following the most radical procedures. It is evident also that the tumors are more malignant in persons under fifty years of age, and that primary and secondary metastases occur more frequently in the younger group.

1930 Wilshire Boulevard

USE OF NEOSTIGMINE (PROSTIGMINE) IN SUBACUTE POLIOMYELITIS*

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A great deal of controversy has existed and still exists over the principles of treatment of "acute and subacute poliomyelitis."

The lay public has warmly accepted Sister Kenny and her concepts of treatment, while the medical world, for the most part, remains unconvinced and dubious. The interviews have not been discussions but the bitter determination of Sister Kenny to force her theories upon the medical profession and public regardless of pathological data. However, Sister Kenny has made a definite contribution to medical science in that she has stimulated a great deal of investigative work. Most of the latter, it is true, has disproven many of her statements and claims but we must admit that it was through her persistence in over emphasizing the role of muscle spasm in poliomyelitis that we gave this symptom much consideration. The presence of spasm is mentioned in our older text-

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books but certainly no emphasis was placed on its importance.

In 1943, Kabat and Knapp[1] suggested the use of prostigmine in the treatment of poliomyelitis. The use of the drug was based on its theoretical physiological ability to "decrease skeletal muscle hypertonus and proprioceptive reflex hyperirritability (muscle spasm)." These actions apparently depend on alteration of function of synapses in the spinal cord.

The effects of prostigmine in the treatment of acute and subacute poliomyelitis have been reported by other investigators.[2,3] Their findings agree in the main with those of Kabat and Knapp. The latter presented encouraging reports on 20 cases in which the drug was used orally and subcutaneously along with hot packs. Painless passive motion was increased and deformities were decreased. It was the authors' opinion that active motion was increased in some cases.

More recently the drug has been tried in treating the symptoms of a large number of complaints as varied as rheumatoid arthritis and cerebral hemorrhage. The tendency in the lay press to ascribe miraculous properties to the drug has dampened the enthusiasm of many practitioners.

Muscle spasm and incoordination have in our experience been troublesome factors in retarding convalescence of many of our poliomyelitis patients. We never have been impressed by Miss Kenny's descriptions of patients writhing in pain due to muscle spasm but we have found that symptom to be constant, though in a variable degree in all of our patients.

During the 1944 epidemic we treated 58 subacute paralyzed cases. These ranged from age six months to forty-two years, the majority being in the group between three to twelve years.

All of the cases showed variable amounts of muscle spasm. The hamstrings, the lumbar group, the gastrocnemii, the posterior cervical and gluteal regions were mostly involved. Eight cases showed marked incoordination and four moderate incoordination.

Eight cases had developed contractures or conditions in which joints could not be moved even ten degrees without undue force or pain. These conditions had developed prior to their admission to our service.

In the course of the routine physical examination, charts were made in which the range of painless passive motion in every joint was tabulated. These examinations were repeated within 24 hours in an attempt to rule out the possible presence of psychic influence.

Measurements were qualitative and improvement in range of motion of less than ten per cent was considered negative. Goniometer measurements were done on only part of the series.

Prostigmine methyl sulfate (Roche) was given subcutaneously and p r o s t i g m i n e bromide (Roche) was given orally. The doses followed closely those suggested by Kabat and Knapp. Adults received 1.5 to 2 mg. of prostigmine methyl sulfate (1-2000) together with 1/100 to 1/150 grains of atropine sulfate. Children between the ages of eight and fourteen received 1 mg. of prostigmine methyl sulfate with 1/200 to 1/250 of atropine sulfate and children between two and eight received 0.5 mg. of prostigmine without atropine. Infants were not given this drug.

Oral doses were for adults, prostigmine bromide 30 to 40 mg. with 1/100 grain of atropine sulfate two to three times daily, given hypodermically, children eight to fourteen years 20 to 30 mg. and 1/200 of atropine two to three times daily, younger children 15 mg. of prostigmine two to three times daily without atropine.

We had used the Kenny method rigidly in 1943 and found it to be expensive, illogical and unsatisfactory. We thereafter treated our patients by no specific methods but used the generally accepted procedures. In addition, hot packs were given four to five times daily along with prostigmine. Eight cases received packs alone for several days and then the combination of packs with prostigmine. The packs and drugs were discontinued when pain and muscle spasm had subsided sufficiently to allow a range of passive motion which was practically normal and painless.

All of the fifty-eight cases showed, upon admission, a limitation beyond 10 per cent of motion on one or more joints. All had varying degrees of paralysis involving more than one extremity. Six children were admitted to the

ward after fairly rigid immobilization and recumbency for periods of from three to ten weeks. Four of these patients could not be placed in a sitting position and two could not sit up longer than a few minutes. The inability to sit was not due to muscle spasm but to marked muscle rigidity. All of these cases had received hot pack therapy under the Kenny routine, prior to their admission on our service.

Dramatic results were obtained in the latter cases. After a single subcutaneous dose of drug, the three could sit up on the side of the bed without any discomfort. The effects were temporary and the doses were repeated as planned. The changes were so startling that the patients and the nurses expressed amazement.

A report of one of these cases may be of interest:

C. B., a 14-year-old white male, the onset of his disease ten weeks earlier, was admitted to the ward after eight weeks of rigid recumbency in another hospital. Muscle examination revealed a fairly even distribution of muscle weakness with no individual muscle or group having less than fair power. Yet the patient was unable to sit, stand or move his ankles, knees, hips, elbows or back beyond a range of 10°. There was marked muscle spasm in the hamstrings, gastrocnemii, posterior cervical and lumbar groups of muscles. Extreme incoordination was likewise present. Hot packs had been given five times daily prior to his admission with no appreciable improvement. The second day after admission prostigmine and atropine were given subcutaneously. One hour later the patient was helped into a sitting position. There was an immediate increase in range of motion in the affected joints of twenty to forty degrees. Hot packs were then applied; six hours later the patient's original symptoms had returned. The next morning the injection was repeated. The effects were very much the same as after the first treatment. After the third day of treatment painless passive motion increased to 80 per cent of normal. After six treatments a completely normal passive range was restored and physiotherapy was instituted. The drug was stopped on the eighth day. Increase in active muscle power appeared to be negligible during the course of administration of the drug.

Results in the other cases were tabulated as follows. Eighty per cent showed improvement to normal ranges of passive motion in from three to eighteen weeks of treatment. Thirty per cent showed dramatic improvement in from one to four days. Twenty per cent showed little or no improvement. Twenty-three cases showed good results only after treatment was interrupted for from five to seven days and then repeated. Oral therapy was disappointing and was discontinued.

All cases with muscle incoordination were definitely improved. None of the cases developed permanent contractures.

Prostigmine may cause unpleasant parasympathetic symptoms in some cases. Fibrillation of denervated muscle is increased and fascicular tract changes may occur. These actions have been attributed to the inhibition of cholinesterase at the myoneural junction of skeletal muscle. Atropine sulfate will usually control these side effects.

Prostigmine did not seem to alter the active power of effected muscles. Totally paralyzed muscles for the most part remained as such. Those muscles that did show increase in active power did so because of other reasons than the use of the drug. Muscle examination done one hour after the use of the drug showed no change in active power of most of the involved muscles.

All of our cases became ambulatory. Fifteen were discharged without paralysis or muscle weakness; twenty-one were without braces and splints; five required bilateral long leg braces and twelve needed unilateral long leg braces; five required shoulder supports; seven needed unilateral short leg braces and eleven showed flexible spinal deviations.

These end results compare favorably with those obtained under older methods of treatment. The results are not a great deal better but we feel we can definitely state that the patients became ambulatory in about half the length of time and hospitalization time was cut considerably. The patients generally looked and felt better than cases treated several years ago.

COMMENTS AND CONCLUSIONS

Fox and Spankus[3] concluded in their case studies that neostigmine (or prostigmine) produced a partial relaxation of the spastic muscles in a majority of cases of acute anterior poliomyelitis. Their results were neither dramatic nor constant. They recommended that the drug therapy be given in combination with the hot packs.

The Carrell-Girard Clinic reported some cases which showed rather dramatic results in muscle relaxation from prostigmine.

Our findings in the subacute cases are at variance with Fox and Spankus in that the results were fairly constant and dramatic changes were seen in a fairly large percentage of the cases.

CONCLUSIONS

(1) Prostigmine given subcutaneously is a valuable adjunct in the treatment of subacute poliomyelitis. It can and probably should be combined with modified hot pack therapy.

(2) Muscle spasm and incoordination are greatly relieved by its daily use or its use in interrupted doses.

(3) The patients become ambulatory more rapidly and hospitalization period can be cut down.

(4) The well-being of the patient seems to be improved.

(5) The return of active muscle power did not seem to be influenced by the drug.

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DISCUSSION (*Abstract*)

Dr. H. R. McCarroll, St. Louis, Mo.—We hear a great deal of discussion about this subject, but nobody knows very much about it. We saw the cases of Dr. Carrell and Dr. Beckering in Dallas, and, as I remember, for every one that they had in which a dramatic result had been obtained, they had probably ten or more in which they had had complete failures or could detect little or no effect. We also saw cases in which the continued use of neostigmine had proved detrimental.

Summing it up from a purely practical standpoint, the use of neostigmine amounts to nothing more than a type of symptomatic treatment for these individuals. If an individual is comfortable, and 99 per cent of them are, if you put them to bed, there is no point in doing anything else to relieve them of pain. When they are not, you try something else. If splinting relieves them, that is sufficient. There are instances in which heat will help. If it does, it is justified. Neostigmine has absolutely no effect on the residual picture of these individuals; it is purely a matter of symptomatic treatment which may be used to help them over the early stages. If it helps and you can relieve them in no other way, all right, but such measures are needed seldom indeed.

There is a certain amount of risk connected with the use of neostigmine. It does not add anything to our present knowledge of poliomyelitis, and even though we may feel justified in using it occasionally, there is no reason to try to kid ourselves into believing that we are accomplishing something as far as these unfortunate individuals are concerned.

Dr. Frankel (*closing*).—We saw many cases of poliomyelitis that had had practically no treatment for six to eight or ten weeks.

A certain number of patients come to us who have been maltreated. Six to ten weeks of rigid immobilization will do something to a patient, and in those cases of maltreatment prostigmine, I think, has been valuable.

So far as its effect on paralysis is concerned, we saw no change. The paralyzed cases are still paralyzed.

We feel that it is a contribution to the treatment if the patient is made even a little more comfortable. It is true we have no cure. Prostigmine is not claimed to be a cure, it is merely another step forward in the treatment of symptoms.

IMPORTANCE OF VITAMINS OF THE B COMPLEX IN CLINICAL MEDICINE*

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In recent years, vitamins of the B complex have been extensively investigated and a voluminous literature dealing with these factors has accumulated. Vitamin therapy has been applied to many diseases and syndromes, at times logically, and at others without justification. It seems worthwhile to stop and take stock of our present knowledge of the B vitamins, to find out where we are and where we are going, to ascertain what facts have been established and what further information is needed.

From the standpoint of the practicing physician answers to the following questions appear to be desirable: (1) What are the functions of the individual B vitamins, (2) what are the human requirements in health and under conditions of stress, (3) what are the important etiologic factors in the development of deficiency

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states, (4) how may vitamin B complex deficiency be diagnosed and under what circumstances is therapy indicated and, finally, (5) what further clinical applications may be anticipated as a result of recent basic research.

We have come a long way in our knowledge of the B vitamins since the observations on beriberi by Eijkman[1] and Grijns[2] in the Dutch East Indies at the turn of this century, since the word vitamin was coined by Funk[3] in 1912 and since the designation "water soluble B" was applied to the antineuritic vitamin by McCollum[4] in 1916. At the present time the vitamin B complex is known to include at least 10 factors each of which has been isolated in pure crystalline form. The factors are thiamine, riboflavin, niacin, pyridoxine, pantothenic acid, para-amino-benzoic acid, inositol, biotin, choline and "folic acid." Information in regard to these factors has been obtained through the cooperative efforts of the biochemist, biologist, physiologist, clinician and many other scientific workers. Human studies, as might be anticipated, have lagged somewhat behind those in other fields. We know that thiamine, riboflavin, niacin, and choline are needed by man and evidence strongly suggests that many and probably all of the other factors of the B complex are essential in human nutrition.

FUNCTION OF THE B VITAMINS

Investigation of vitamins has emphasized the concept that metabolism is cellular rather than systemic and has clarified our understanding of a number of intricate metabolic processes. Some of these essential dietary factors have been shown to function as a part of enzyme systems which are vital in maintaining normal body chemistry. Four of the vitamins of the B group are known to have such activity. Thiamine pyrophosphate or co-carboxylase is a co-enzyme in the utilization of carbohydrate. In thiamine deficiency pyruvic acid, an intermediate metabolite in the breakdown of carbohydrate, accumulates in the tissues. Riboflavin,[5] in the form of specific flavo-proteins, is a part of at least three enzymes which function in tissue respiration. Niacin is a component of co-enzyme I and co-enzyme II which are concerned with both glycolysis and cellular respiration. Pyridoxine[6] has recently been shown to be a constituent of co-enzymes which are important in protein metabolism in reactions of decarboxylation and transamination.

The role of choline in the body has not been completely elucidated. Choline[7] is found in the phospholipid lecithin and in acetyl choline. It is known to serve as a donor of labile methyl groups and to have a role in the mobilization of fatty acids in the body. In choline deficiency fat accumulates in the liver. Inositol, also, appears to have a lipotropic effect and is important in the prevention of certain types of fatty liver. Recent evidence indicates that "folic acid" is needed for the formation of red blood cells. The exact functions of pantothenic acid, biotin and para-amino-benzoic acid are unknown although the manifestations of deficiency of each of these factors have been studied in experimental animals. It is possible that some or all of these vitamins will be found to be part of enzyme systems. They no doubt have a function in very fundamental processes as they are required by even the simplest forms of life such as bacteria.

REQUIREMENTS OF THE B VITAMINS

Information concerning the human requirement of vitamins of the B complex has been obtained in various ways. Dietary analyses have been made in areas where deficiency disease is endemic and the minimum intake which is preventive of deficiency has been noted. Animals have been fed purified or synthetic diets, deficiency syndromes produced and the findings in regard to requirements applied to man. Laboratory tests have been devised for determining the levels of some of the vitamins in body fluids and tissues. Thiamine, niacin and riboflavin deficiency have been induced in human beings both with the use of diets of natural foodstuffs and, in few instances, with purified or synthetic diets. Conclusions in regard to the requirement of nutrients as determined by these various studies have differed considerably. There are many reasons for the variability of findings. It has recently been demonstrated that bacteria in the human intestinal tract can synthesize a number of the vitamins, including thiamine,[8] riboflavin[9] and biotin.[10] Composition of the diet, such as the kind of cereal or sugar which predominates, may have a profound effect on in-

testinal synthesis. Deficiency of one vitamin may influence synthesis of other factors and may also affect utilization of these factors in metabolic processes. The vitamin stores of the body at the time of beginning experimentation may influence findings. Individual variation must also be important in requirement. Human studies thus far have been limited in large measure to young healthy adult males. Requirements will certainly be higher during growth and in periods of physiological and pathological stress. Much more investigation along these lines is needed.

In spite of these variables and uncertainties, considerable evidence concerning human requirements of at least three of the B vitamins, thiamine, riboflavin and niacin has accumulated. Recent investigators[11] agree that from 0.24 to 0.44 milligrams of thiamine per 1,000 calories of diet will protect against deficiency of this factor. Some workers set the lower limit of intake at 0.35 milligrams per 1,000 calories. There is less agreement in regard to riboflavin. Several groups[12] have reported that no signs of deficiency were noted when as little as 0.31 to 0.35 milligrams of riboflavin per 1,000 calories of diet was ingested. Sebrell and Butler[13] produced riboflavin deficiency when the diet contained 0.20 mg. per 1,000 calories.

The amount of niacin needed daily is unknown. Aykroyd and Swaminathan[14] have estimated that the diet of rice eaters, who rarely develop pellagra, contains approximately 5 milligrams of niacin while the diet of maize eaters, in whom pellagra is frequent, contains much larger amounts of this vitamin. This is evidence for the hypothesis that maize contains some material which favors the development of niacin deficiency.

There is no information in regard to human requirement of the other B vitamins, but if estimations in animals are applied to man, pyridoxine may be needed in amounts of 2 mg. and pantothenic acid 5 mg. daily.[5]

On the basis of available information, the Food and Nutrition Board of the National Research Council has recommended certain daily allowances for thiamine, riboflavin and niacin, the amounts varying with age, sex and degree of physical activity. These recommended allowances are considerably higher than the figures given above which represent the minimal quantity necessary to prevent deficiency disease. A factor of safety has been included. If an individual is receiving a diet which fulfills the recommended allowances, the physician can be reasonably certain that the diet is satisfactory. If the reverse is true, it does not necessarily follow that the diet is deficient. These allowances are a goal toward which to strive or a pattern with which to compare diets which need evaluation.

There is evidence that larger quantities of essential nutrients are required for optimal nutrition than are needed for the prevention of deficiency disease. It appears probable, and not mere wishful thinking, that general health and physical fitness may be improved and that a better race may be developed with an optimal diet. Some evidence for this may be cited.

Studies which have been carried out on women during pregnancy, both in Toronto[15] and at Harvard University,[16] have shown that the course of pregnancy and labor, and infant mortality and morbidity have been favorably influenced by improving the maternal diet. In addition, fewer congenital abnormalities were noted in infants whose mothers received a good diet. Warkany[17] has shown, in animals, that maternal dietary deficiencies may result in the development of fetal abnormalities.

Studies in American and Canadian Universities[18] indicate that students of the present generation are taller and heavier than were students of former years. Observations of the second generation of immigrants show an improvement in stature of these individuals in comparison with their forebears. Nutrition appears to be one important factor contributing to these changes. Sherman[19] studied rats whose heredity was similar and found that a good diet promoted longevity.

Harrell[20] has recently shown an improvement in learning ability in children who were given an abundant supply of thiamine. There is evidence that nutrition is a significant nonspecific factor in resistance to bacterial infection and that an optimal diet is important in convalescence and rehabilitation.[21] All of these findings indi-

cate that diet may have an important role in preventive as well as in curative medicine.

ETIOLOGIC FACTORS IN DEFICIENCY OF THE B VITAMINS

There are numerous pathologic states which are important predisposing and precipitating causes of deficiency disease. The clinician should be aware of the possibilities and guard against the development of deficiency, or institute therapy, whenever symptoms and signs appear which suggest an inadequate supply of nutrients. The common etiologic factors are conditions in which metabolism is speeded up and diseases associated with poor absorption, improper utilization or distribution, or increased excretion of essential chemical materials. Specifically, the need for vitamins of the B complex appears to be increased during periods of rapid growth, in pregnancy and lactation, in hyperthyroidism and in infections, especially those of long duration accompanied by fever. In our experience at Charity Hospital in New Orleans, the infectious diseases most commonly associated with signs of deficiency of the B vitamins are tuberculosis and rheumatic fever. There is evidence that the incidence of these infections is increased in areas where vitamin B complex deficiency is prevalent. In hyperthyroidism[22] experiments conducted both in animals and man indicate that the administration of large amounts of the B group of vitamins, in the form of yeast or liver extract, will promote gain in weight and improvement in general physical status in spite of continuance of the hypermetabolic state.

Poor absorption of the B vitamins may occur in diarrheal diseases, in any lesion of the gastrointestinal tract associated with inflammation and edema, after short circuiting operations, following prolonged periods of vomiting from any cause, and in achlorhydria. The use of adsorbents and alkalis has been shown to effect absorption of some of the B vitamins. Diarrhea interferes with absorption not only by increasing motility but also by decreasing vitamin synthesis. In addition, noninflammatory degenerative lesions in the small intestine may occur which further impair absorption.

In congestive heart failure vitamin B complex deficiency is a frequent finding due to the combined influence of anorexia, poor absorption, and poor distribution and utilization of nutrients as a result of the failing circulation. Improper utilization of the B vitamins may occur in liver disease. In cirrhosis, manifestations of deficiency of these factors is almost universal. The same is true of chronic alcoholism with which cirrhosis is often associated. Alcoholic gastritis and the high percentage of calories obtained from non vitamin sources are contributory to this deficiency. Right-sided heart failure and peripheral neuritis in chronic alcoholism usually respond to the administration of thiamine.

An increase in the excretion of some of the B vitamins may occur as a result of polyuria. This has been demonstrated following the administration of diuretic drugs and may occur in diabetes mellitus and diabetes insipidus. Postoperatively, the use of glucose in parenteral feeding may precipitate vitamin B complex deficiency if continued for long periods of time. Vitamin supplements should be added to infusions. An increase in the carbohydrate content of the diet increases the demand for thiamine and probably for other B vitamins. The control of diabetes with insulin has occasionally precipitated thiamine or niacin deficiency.

Other conditions in which deficiency of the B vitamins are commonly observed are malignancy and diseases in which special diets have been prescribed such as food allergies or peptic ulcer. Deficiency syndromes are often seen after trivial illness in areas of the country where the dietary habits are poor and food intake borders on inadequacy.

DIAGNOSIS OF DEFICIENCY

The accurate clinical diagnosis of vitamin B complex deficiency is not easy. Many of the symptoms and signs are nonspecific and certain changes can be due to a deficiency of any one of several factors. However, in the presence of an inadequate diet or of some condition which predisposes to deficiency of vitamins of the B complex, the clinician can make at least a presumptive diagnosis by careful examination and laboratory tests. Findings depend on which factors are lacking and on the degree and duration of the deficiency. If there is an insufficient supply of the whole vitamin B complex, thiamine is the limiting factor and evidence of deficiency

of this vitamin dominates the clinical picture. In most instances multiple deficiency will be present. In any case there are various stages in the development of deficiency disease. At first the tissue stores are depleted. Then there are biochemical changes which lead to functional disturbances. Finally structural damage results. Diagnosis before the terminal stage is desirable but extremely difficult. Laboratory tests are being sought which will detect deficiency in its incipiency and a few of these will be mentioned later. The clinician must still rely, in most instances, on symptoms and signs of disordered function or structure.

Thiamine deficiency has been induced experimentally in human beings by several groups of investigators.[11–23] Early symptoms are anorexia, changes in mental attitude and behavior, apathy, depression, emotional instability, fatigue, lassitude, lack of cooperation, and deterioration of judgment and foresight. There is a diminution in work output and endurance. In more advanced deficiency metabolic changes are discernible and physical signs make their appearance. The latter include tenderness of the calf muscles, sensory disturbances, muscular weakness and pain in the lower extremities. There is an accumulation of pyruvic acid in the blood and a decrease in glucose tolerance.

Signs of severe, late thiamine deficiency are well known: peripheral neuritis and beriberi heart disease. The latter is difficult to diagnose and specific findings cannot be discussed here. Recognition depends upon the dietary history, ruling out other etiologic factors in heart disease, eliciting signs which are characteristic of this condition and, at times, in administering a therapeutic test.

The most common manifestations of riboflavin deficiency are angular stomatitis, cheilosis, glossitis, changes in the sebaceous glands about the nose, eyes and ears, and certain visual disturbances including photophobia and corneal vascularization and opacities. None of these findings is specific and each can occur as a result of other pathologic conditions.

Niacin deficiency is manifested at first by the nonspecific complaints of weakness, lassitude, depression and anxiety. Following this the tongue becomes red and sore and ulcerated lesions develop in the mouth. The typical findings of pellagra, namely, dermatitis, diffuse inflammation of the gastro-intestinal tract and severe psychic disturbances, are often late in appearance. Acute niacin deficiency may be manifested by an encephalopathic picture or by findings which resemble a toxic psychosis. These manifestations are most often encountered postoperatively or in the course of severe infections.

In New Orleans, the findings which are observed most frequently which suggest a deficiency of vitamins of the B complex are changes in the color, texture and papillae of the tongue, lesions at the angles of the mouth, changes in the skin, calf muscle tenderness and pains and hyperesthesia in the lower extremities. At times cardiovascular disturbances suggesting beriberi are seen.

A number of laboratory tests have been developed which assist in determining nutritional status in regard to the B vitamins. The urinary excretion of thiamine, riboflavin and derivatives of niacin can be determined. An excretion of less than 60 micrograms of thiamine by the male, or less than 40 by the female, in a 24-hour urine specimen is suggestive of deficiency of this vitamin.[24] An excretion of less than 200 micrograms of riboflavin in 24 hours is considered a subnormal output. The urinary excretion of niacin derivates is decreased in pellagra and one metabolite, designated F_2 (N methyl nicotinamide or derivative), may disappear from the urine in niacin deficiency.

Holt[25] has suggested that determination of excretion of these vitamins in a one-hour urine specimen obtained during fasting is a good test of nutritional status. We have used this procedure in studying a large number of individuals receiving various diets, including patients with signs of vitamin deficiency, and feel that it holds promise of being a most useful diagnostic aid.

Another laboratory procedure of merit consists in the administration of a test dose of thiamine, riboflavin and niacin either orally or parenterally, and measuring the urinary excretion of these vitamins in a period of several hours thereafter. Standards are being set up so that one may determine whether a given output indicates normalcy or deficiency.

In testing for thiamine deficiency the quantity

of pyruvic acid in the blood may be measured in the post-absorptive state or after the administration of glucose. There is an increase in pyruvic acid in moderate and severe deficiency. It is also possible to obtain tissue biopsies and to determine the quantities of the B vitamins which are present. Further studies of this type may give valuable information.

Methods are available for measuring other members of the vitamin B complex in body fluids and in foods but since the significance of these substances in human nutrition is largely unknown, the clinical value of these procedures remains to be determined.

OTHER USES FOR VITAMINS OF THE B COMPLEX

Recent experiments in animals have indicated that there may be a number of conditions, in addition to those mentioned above, in which therapy with vitamins of the B complex may prove useful. One of the most important of these is cirrhosis of the liver. Fatty infiltration, necrosis and cirrhosis of the liver have been produced in animals by various experimental diets.[26] Protein, choline, methionine and inositol have been shown to prevent or to reverse certain of these pathologic changes. In man, cirrhosis is commonly associated with a limited diet. There have been numerous reports of the treatment of human portal cirrhosis with a high protein diet, choline and methionine, with clinical improvement.[27]

Certain substances have been discovered in foods which have an anti-vitamin action. Biotin deficiency has been produced in animals and in man by diets containing large amounts of raw egg white. The explanation of this observation is that avidin, a component of egg white, combines with biotin to form an inactive complex which is not absorbed.[10] Certain raw fish contain a substance which is destructive of thiamine. A deficiency disease has been produced in animals by feeding these fish, which condition can be cured by the administration of thiamine.[28] Rats who are fed a diet containing a high percentage of corn or corn products show a retardation of growth which can be counteracted by the administration of niacin or of tryptophane.[29] These findings may possibly be accounted for by changes in the intestinal flora, with a diminished synthesis of niacin when the diet is high in corn. These observations may be of importance in clarifying some of the problems of human pellagra.

The possible relationship between macrocytic anemia and vitamins of the B complex has been discussed for many years. In pernicious anemia, an extrinsic factor in the diet is believed to combine with an intrinsic factor in the stomach to form a principle needed in erythrocyte maturation. In a number of macrocytic anemias such as sprue and tropical macrocytic anemia, it has been postulated that the extrinsic factor is lacking. This factor is found in beef, liver and yeast, all of which are good sources of the vitamin B complex. Castle[30] conducted experiments which indicated that none of the 10 crystalline factors of the B group of vitamins are related in a direct simple way to the extrinsic factor. It is possible that a combination of several B vitamins or some undiscovered substance is important.

Experiments have shown that hypochromic anemia occurs in pyridoxine deficiency in dogs.[31] Pyridoxine and its derivatives are also related to anemia in chicks. A deficiency of vitamin Bc, folic acid or L. casei factor (closely related substances) appears to be important in the production of certain anemias in chicks,[32] rats[33] and monkeys.[34] Pantothenic acid seems to have a role in blood formation as shown by experiments in rats. These factors, pyridoxine, pantothenic acid and folic acid, may prove to be of clinical importance in obscure anemias in man, especially those of nutritional origin and of macrocytic type. Spies[35] has recently reported that synthetic folic acid has anti-anemic properties producing reticulocytosis and improvement in hematologic findings in macrocytic anemia. Recent studies in our nutrition clinic indicate that folic acid influences blood formation in nutritional macrocytic anemia. Patients given L. casei factor, or concentrates of this material, have shown a reticulocyte response and an increase in hemoglobin and erythrocyte count.

The pathogenesis of sprue is far from clear but all evidence points to a close relationship to vitamin B complex deficiency and pernicious anemia. Niacin is of value in the treatment of sprue but is not entirely curative and yeast or liver extract must be administered.

Folic acid and pantothenic acid appear to be important, too, in the prevention and cure of certain types of leukopenia in animals.[36] Watson and Sebrell[37] have reported an improvement in leukopenia induced by radiation therapy with the administration of folic acid. Other leukopenias may be found to be similarly influenced.

A number of miscellaneous findings pertaining to therapy with the vitamin B complex are of interest. In dogs in which shock was produced by hemorrhage, the survival time was increased by the administration of thiamine.[38] It was shown that dephosphorylation of thiamine occurred in shock, and that giving large amounts of this vitamin appeared to favor resynthesis of co-carboxylase. A breakdown of co-enzyme I and of riboflavin containing enzymes in shock was also reported. These observations may be applicable to the therapy of shock in man and indicate that vitamins may be useful in conditions unrelated to a faulty diet.

There seems to be a relationship between certain of the B vitamins and tumor formation.[39] In experiments in mice, folic acid and L. casei factor strongly inhibit tumor growth. A diet low in biotin prevents the formation of certain tumors in animals. The combination of a diet high in protein and the B vitamins, especially riboflavin, is protective against the formation of hepatic tumors in rats due to the administration of an azo dye, "butter yellow." From these observations it should not be concluded that any of these factors will influence carcinoma in general. However, further study should result in a better understanding of factors concerned in neoplastic growth.

A close relationship between vitamins and hormones is becoming apparent. Hertz[40] has reported that L. casei factor is needed in the metabolism of stilbestrol in the chick and monkey, and has suggested that it may function in the physiology of reproduction and in new tissue formation. Several investigators[41] have shown that thiamine and riboflavin are connected with the metabolism of estradiol and its inactivation by the liver. In animals who are deficient in these two vitamins, the liver is unable to inactivate this hormone. Such findings may have important clinical applications.

In the preceding discussion, some of the spectacular advances in our knowledge of vitamins of the B complex have been reviewed and present concepts of the role of these vitamins in human nutrition have been presented. Certain applications of recent findings in animal research to clinical medicine were suggested. Although much has been achieved many perplexing problems remain to be solved. More precise tests are needed for the study of human nutrition and new tools must be developed. Long term studies of human beings under carefully controlled conditions should be instituted.

Present trends in basic research indicate an increasing interest in intermediary metabolism and in the interrelationships of vitamins, hormones, amino acids and other chemical substances. In clinical research, investigation is concerned with the relationships of nutrition to disease, to immunity, to rehabilitation and to the aging process. It is anticipated that the cause of many chronic disorders, epecially those which are commonly associated with malnutrition, will be discovered and that light will be thrown on the nature of some of the degenerative diseases. Eventually we may learn how to attain, as McCollum[42] has suggested, the highest perfection of nutrition for the human species.

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DISCUSSION (*Abstract*)

Dr. Edgar Jones, Vanderbilt University School of Medicine, Nashville, Tenn.—The member of the B complex which has most recently become available in a pure state for clinical investigation is "folic acid" or L. casei factor. Dr. William Darby, Dr. Howard Johnson and I have had some recent experience with this factor.

Similarities of the sprue syndrome in man to the manifestations of vitamin M deficiency in the monkey are suggested. Day and co-workers have demonstrated that L. casei factor is curative for vitamin M deficiency in monkeys. Synthesis of the L. casei factor by the Lederle Laboratories has enable us to administer this material to two patients with sprue. Striking clinical and hematological changes have occurred rapidly following the daily intramuscular injection of this synthetic material as the sole therapeutic agent.

The first case treated was a 51-year-old white man who was admitted to the Medical Service of Vanderbilt University Hospital on September 24, 1945, with the complaint of sore mouth, diarrhea, weakness and weight loss over a period of 10 months. All criteria generally accepted for the diagnosis of sprue were fulfilled. These were glossitis, diarrhea with increased fat in stools, marked loss of weight, pigmentation of the skin, macrocytic anemia, moderate leukopenia, impairment of absorption as indicated by a flat oral glucose tolerance curve and vitamin A tolerance curve, characteristic gastro-intestinal pattern on x-ray examination, and a very low serum carotene. The patient had free hydrochloric acid on gastric analysis. On October 4, 1945, he was started on intramuscular injections of 15 mg. of the synthetic L. casei factor. Four days later the symptoms of glossitis had disappeared; on the next day there was definite papillary regeneration. On the ninth day of such therapy the reticulocytes reached a peak of 15.3 per cent and marked increase in thrombocytes was noted. The hematological improvement has continued, accompanied by marked general betterment including regeneration of the lingual papillae, subsidence of the diarrhea and considerable gain in weight. Oral glucose tolerance and vitamin A tolerance curves became more nearly normal.

The second case was that of a 22-year-old white woman who was admitted on October 15, 1945, with the complaint of diarrhea, sore mouth, and general debility, which had its onset during the third trimester of pregnancy. These symptoms had persisted for three months until the time of admission, during which time the patient had lost some 34 pounds below her usual non-pregnant weight. Again all of the usual criteria necessary for the diagnosis of sprue were fulfilled. Sternal aspiration revealed a marrow typical of that seen in sprue and pernicious anemia. Gastric analysis revealed free hydrochloric acid after histamine stimulation. Treatment with 15 mg. daily of L. casei factor intramuscularly was instituted on October 19, 1945. On the sixth day of treatment reticulocytes reached a peak of 43 per cent. Five days after starting treatment the predominating type of nucleated red blood cells of the marrow had changed from megaloblasts and erythroblasts to normoblasts. Hemoglobin regeneration occurred more slowly than did the increase in red cells. Coincident with these changes there was an

increase in white blood cells, and a marked and sustained increase in platelets.

The third case was a white man, aged 67, admitted November 8, 1945, with complaint of weakness, diarrhea and weight loss. A diagnosis of sprue had been made in this hospital in 1939. He responded to treatment with crude liver extract and this was maintained as long as liver extract was continued. On October 24, 1945, he returned with the symptoms mentioned. He said that he had received liver extract irregularly. He again had typical findings of sprue. His admission red blood cell count was approximately 2 million, the anemia being macrocytic. His reticulocytes rose rapidly from a pre-treatment level of less than 1 per cent.

Castle has reported that folic acid administered by mouth is without effect in doses up to 3.6 mg. daily in patients with pernicious anemia, and Watson et alii found L. casei factor ineffective in the treatment of 8 cases of "refractory anemia." Spies and co-workers have recently found this factor active in the treatment of unspecified macrocytic anemia.

Our results demonstrate that two cases of sprue have improved markedly following the parenteral administration of synthetic L. casei factor. It is reasonable to attribute the observed improvement to a specific effect of the substance administered, although one cannot definitely rule out the possibility of spontaneous remissions. The relation of this material to the material effective in pernicious anemia cannot be answered at this time.

Dr. C. A. Mills, Cincinnati, Ohio.—The chairman mentioned relief from the toxicity of hyperthyroidism obtained by giving thiamine, but without relief from the high metabolic rate. We have been studying this in animals (rats) and have found exactly the same thing. Killing doses of thyroid extract given to white rats cause them to stop eating and go down in weight, even to extreme emaciation and death, but become quite harmless so far as the nutritional state of the animal is concerned if we give additional thiamine at the same time. The high metabolic rate goes on and the animal eventually dies with extreme tachycardia and cardiac irregularities, but in good nutritional state.

This has also been the clinical experience of recent years. Thiamine does help the thyrotoxic patients to improve nutritionally, but it does not have much influence on their heart disturbance.

The other point I should like to stress is the necessity of an adequate intake of the B vitamins in conditions where the appetite is failing or the food intake reduced for any reason.

I think that Cowgill was right in his original presentation of the role of thiamine in cellular combustion that it is not primarily dominated by caloric intake but rather by the mass of metabolizing protoplasm.

We have just finished a piece of work which shows very clearly that the thiamine percentage in the diet must be steadily increased as animals age and as their food intake goes down. The thiamine requirement per gram of tissue remains fixed, but as appetite goes down with age, we must give a diet richer and richer in thiamine. For instance, weanling rats will go into fatal thiamine-deficiency convulsions on about 0.4 milligrams per kilogram of the synthetic diet; but as they grow older, the fatal deficiency level goes up, with fatal convulsions occurring on diets that have 1.6 milligrams per kilo.

This means that vitamin supplementation should be used in any condition of reduced food intake, prolonged more than one or two weeks. This would apply with advancing age, with illness where the food intake is reduced for more than two weeks and certainly with weight-reduction diets. We make it a rule here in Cincinnati at the Medical Clinic always to use vitamin supplementation with weight-reduction diets when the reduction is down to 1,200 or 1,000 calories a day. Also, in hot weather heat prolonged more than two weeks, the vitamin requirement per gram of food goes up and should be covered by supplementation.

NORTH CAROLINA SCHOOL-HEALTH COORDINATING SERVICE*

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The North Carolina School-Health Coordinating Service, established in 1939, is a joint activity of the State Board of Health and of the State Department of Public Instruction. From the beginning the organization has been stimulated and partly financed by the General Education Board and by the International Health Division of the Rockefeller Foundation. This coordinated service is unique in North Carolina in that two state departments have combined their resources to attack a single problem which is of common interest to both departments, an arrangement which, no doubt, presages further combinations along this same line in regard to other state departments which have similar objectives.

The reasons for this joint organization are self evident and need not be explained to this audience. It is sufficient to say that for many years health departments have carried out health work in schools; in like manner school organi-

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zations have carried out similar work. In both instances considerable success was attained but invariably there came a time when the schools needed the assistance of the health department and the health department needed the assistance of the schools. The North Carolina School-Health Coordinating Service takes care of this situation by bridging gaps and by preventing overlapping.

To direct the work, a coordinator was appointed who has full charge and who is responsible to the heads of the education and health departments. Assisting the coordinator on one hand is an advisory committee and on the other hand a technical staff. The advisory committee consists of five members, one from the State Department of Public Instruction, who is the chairman; one from the State Board of Health; one from the Physical Education Department of the State University; one from the Science Department of East Carolina Teachers College; and one a general medical practitioner. The technical staff includes one medical officer, four public health nurses; three health and physical educators; two nutritionists, and one health educator. Of this number, one physician, one public health nurse, one nutritionist, and one health and physical educator are Negroes, who work exclusively in Negro schools.

Approach.—In order to carry out its work more effectively it is essential to get the cooperation of the local school administrations and health departments. The purpose of the School-Health Coordinating Service is to train teachers to do a large share of the health instruction, and in conjunction with the local health department staff, to simplify and facilitate health services for the school children. As a result of this policy it will readily be seen that the approach is towards improving the knowledge of teachers and health staffs in regard to health instruction and health services, by bringing them into a closer working relationship. In following this plan emphasis is always placed on the use of every day school experiences in health teaching in order that the health habits and attitudes so gained may be carried by the children from the schools to the homes and the communities.

The general plan of work has been approached from three directions: (a) pre-service training, (b) summer conferences and workshops, and (c) in-service training in the field.

Pre-Service Training.—Little progress has been made in pre-service training, although considerable interest has been manifested by the Department of Public Instruction and by the teacher colleges. Securing teaching personnel, rearranging the curriculum, and finding adequate time for the subject are three difficulties which can be appreciated by those who have had experience in teaching institutions. These obstacles are real but can be overcome when given sufficient study by responsible authorities. Steps have been taken in North Carolina to include health teaching in the curriculum of some of the teacher colleges, but not in all of them. The war has contributed to this delay.

Summer Conferences.—Through the assistance of an Educational Foundation, summer conferences have been held in North Carolina regularly since 1940, at four state institutions, two white and two colored. The teachers who attend these conferences are awarded scholarships which pay one-half of the total cost. The course of instruction lasts six weeks and comprises such subjects as personal health; school and community hygiene; nutrition; physical education; mental and sex hygiene; and methods and materials of health education. On the satisfactory completion of the course the teacher is awarded six semester hours credit on graduate study or on certification. During the five years 771 teachers have attended the summer conferences. These conferences provide the only source of instruction in health education which those who are now teaching can have.

In-Service Training in the Field.—This phase of the work has occupied the greater part of the time of the School-Health Coordinating Service Staff. Since the beginning, 15 counties have received the benefit of in-service training by the whole staff and an equal number by part time service by one or more staff members. Considerable time is taken up with preliminary arrangements before entering a county. Joint conferences with superintendents and health officers are held to elicit interest and a desire on the part of the officials for the work. In the beginning counties with well organized school

and health departments are selected as, all things considered, they are able to cooperate more effectively in making a success of the program.

Before in-service work is started in a county two preliminary meetings are held, one for the principals and health officer, and one for the teachers and health staff.

At the principals' meeting the total number of teachers are grouped into classes of fifty and are asked to meet at designated times at designated schools. These group meetings are eight in number, that is, eight meetings of one hour each, or four meetings of two hours each.

At the teachers' meetings the school-health staff is introduced and each member explains the purpose of his work and the methods by which it is carried out. All necessary details are given in order to acquaint the teachers and health staff with the procedures so that they may be in a position to cooperate to the greatest extent. In addition the teachers and health staff are provided with a memorandum concerning the work.

For convenience, the in-service training is divided into two general parts: (a) group conferences and (b) visits to schools.

In the group conferences six subjects are discussed: health service, health teaching, physical education, nutrition, sanitation and communicable diseases.

While these are in progress and afterwards each member of the staff visits the schools and aids the teacher in carrying out the subject matter discussion at the group conferences, or any other plans which the teacher wishes to develop. Before the work is completed it is the endeavor of the school-health staff to visit each school at least once during the stay in the county. The number of visits to an individual school is determined by the interest shown by principal and teachers. During the visits to the schools the staff nurses aid the teachers and local nurses in screening the children for defects, and assist them in having the defective children brought to the attention of parents and physicians. The length of stay in a county has been about two months, but this time may be increased by the development of other methods.

Local Coordinator.—One of the difficulties which the in-service program has experienced from the beginning has been the inability to provide means to have the work carried on after the staff leaves the county. Re-visits are valuable and necessary but are not practical if new counties are to be reached. After considerable discussion, the advisory committee decided that the best procedure was to train teachers in health education over a period of one year. The training will include nine months of didactic teaching and three months of supervised field studies on such public health subjects as administration, sanitation, statistics, communicable disease control, nutrition, mental health, school health, community organization, methods and materials in health education and elective subjects. On the completion of their training the teachers return to the county and become responsible, under the school and health authorities, for the school-health work. Scholarships are provided for this training. This method has proved to be satisfactory. The first group of teachers completed their training in August and began work in counties in September of this year. The training of teachers in health education to carry on the school-health-community work is new and is a definite advancement in school-health work in North Carolina.

FUTURE CONSIDERATIONS

Coordination of other Divisions in the two Departments.—It is well known that many other departmental divisions in education and health are concerned with school-health work but have no actual participation in it. Steps have been taken to bring these divisions together in order that their efforts may be unified and that the facilities in both departments may be made available for school-health needs.

Regional Summer Conferences.—The summer conferences heretofore have been confined to four state institutions. Many of the teachers who desired to do so could not attend these conferences on account of the distances to be traveled. To meet this problem it is the present intention to set up regional conferences, located in both white and negro teacher colleges. This arrangement should decrease the cost, and increase the number of teachers who attend the conferences each summer.

County-wide Health Education Workshops.—As already mentioned, additional fields relating to school-health remain to be explored. There is a lack of clear understanding of these needs by official and voluntary agencies and by community leaders. To assist in meeting these problems it is proposed to hold a series of county-wide workshops in health education during 1946. The areas selected for these workshops will be limited to the counties in which health educators are employed.

The workshops are to be under the administrative direction of the Extension Division of the State University. Instruction will be furnished by the Extension Division and by the School-Health Coordinating Service staff. Those attending the workshops will include personnel from the local school administrative and teaching staff, the health department and voluntary agencies and leaders in the community.

Through these workshops attention will be focused on health needs and interests peculiar to the county involved in order that local groups may be stimulated and guided toward practical solutions of their school-community health problems.

Scholastic Credits.—In carrying out the in-service program eight group conferences are held for the teachers, but no scholastic credit is given to the teachers for attending these conferences. The question of giving credits through the Extension Department of the University is now being actively studied by the University authorities. To obtain two semester hours credit it is necessary to attend 30 group conferences. The staff of the School-Health Service will do the teaching under the direction of the University Extension Division. The credits will be granted by the Extension Division of the University Department of Education.

CONCLUSION

It is the opinion of the heads of the two departments, Education and Health, that this joint cooperative arrangement is highly satisfactory. This is also the opinion of the health and education officials who have had the benefit of the in-service program and of the faculties in Teachers Colleges where summer conferences have been held.

DISCUSSION (*Abstract*)

Miss G. Bush, Columbus, Ohio.—I should like to ask the speaker who finances the technical staff if it is a loan from the two divisions or is it a special budget for the entire technical staff supplied by the two departments.

Dr. C. A. Wilzbach, Cincinnati, Ohio.—I should like to say how much I appreciate this paper. With some knowledge about what the Health Education Group of the A.P.H.A. has been saying about this business of who shall teach health in the schools, I should say that North Carolina has moved far ahead of the procession and has worked out what we have been thinking ought to be worked out in the teaching of health.

The educator has said that the doctor does not know how to teach, and the doctor has said to the educator, "You do not know what to teach about health." We have not been getting together, and this looks like an approach to a sound plan.

It seems to me to be on the broad field that it should be. Health education is too big for any one profession to try to handle alone. This plan, it seems to me, is in the right direction.

Dr. Felix J. Underwood, Jackson, Miss.—I wish to say that this plan that has just been so well described to you by the essayists has worked well in Mississippi. The two state departments, health and education, have for about two and a half years carried this program into effect and the members of both departments are highly pleased. I think the people have been benefited greatly and they, too, are greatly pleased to see such a program put over by two state departments working together harmoniously and very effectively.

I hope that all other states will join the procession. I think we ought to quit fussing about who will do this and who will do that in health education and join hands and hearts, as North Carolina and Mississippi and maybe other states have done.

We really patterned our program largely after the one carried out in North Carolina, and we are carrying out a program that is very worthwhile.

Dr. Ellinwood (closing).—Our program is partly financed, as I said, by the International Health Division and the General Education Board of the Rockefeller Foundation, and these organizations are continuing their support on a yearly decreasing scale. The State Department of Public Instruction and the State Board of Health have always contributed to the budget and in 1945 their contributions amounted to about two-thirds of the budget. The General Education Board still supports the Summer Conferences.

Yesterday health education was emphasized in the Public Health Section, especially at the round-table discussion, and reference was made to teachers being used to help in the education of the public. Yet, nothing was said about the part teachers play in the education of school children.

I think this is most important and it is one of

our jobs to weave a well-balanced, practical health program into the fabric of our school systems, because these school children are our future citizens, our future voters, and our future politicians. If we can instill into their minds sound, fundamental public health principles, we will not need to worry about whether we will have enough money to support our health departments. They are going to demand that we have a good public health program.

I was glad to hear from Dr. Underwood about the School-Health Program that is being carried out in Mississippi. I had an opportunity this year to observe the work that is being carried on in his state and I can assure you that they have a splendid program. I was especially impressed with the excellent coordination that existed between the State Board of Health and the State Department of Public Instruction.

SOME FUTURE PROBLEMS IN ALLERGY*

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The war is over, almost, and soon we can reestablish our laboratories. It is necessary to stop to consider some of the problems that are before us so that work in our clinics will be something more than routine, and so that it may lead to increase in our knowledge and better training for the young men who will come back to work with us.

I have chosen to discuss three problems which seem to me important. There are, however, other topics and problems which many of you will consider more important. The field of allergy is larger than before and it becomes larger still as our concepts spill over into other areas. Skin tests and eliminations no longer represent the only approach to the treatment of our patients. The principles of sound medical practice are being applied with ever increasing pressure. What I have to say is not new and it is full of questions which need answers.

THE ASTHMATIC STATE

The first topic is the obvious one: What is the "allergic" or the "asthmatic" state? What is the "allergic individual?" Why is it that only a few persons become clinically sensitive? We need further studies of the natural history of allergy. In childhood, eczema is very common and usually clears away before the age of eight or ten. What is the exact percentage? How many patients who suffer from eczema in childhood develop other manifestations of allergy later: hay fever in their teens, asthma in their twenties, or possibly migraine later on? Are those the same individuals who as they grow older manifest reactions to penicillin, to the sulfonamides, or perhaps get into trouble with industrial dermatitis or industrial asthma? In other words, must we not regard the "asthmatic state" as dependent upon a physiologic change and regard the "allergic individual" as having something about him which is basic and fundamental and which lasts all through his life? To understand this basic factor might be to relieve all our patients and perhaps by a very simple treatment.

Intrinsic asthma has interested me for a long time. Is the kind of asthma or hay fever or eczema which begins at the age of forty-five the same kind of disease as the conventional allergy which begins in childhood? To me the contrast between the two seems quite definite even though their symptoms are much the same. Individuals who begin their symptoms after the age of forty-five are usually not allergic, at least in my experience. Their stories give no evidence of change in their symptoms either for better or for worse in accordance with the time of year or with changes in environment. I can anticipate and expect that their skin tests will be entirely negative, and they are negative with few exceptions. Allergy is not good enough as an explanation of their troubles.

The other day I read a short note concerning a fatality from making skin tests on an old lady of seventy-one years of age. This old lady weighed only seventy-five pounds; she was emaciated and she had asthma. Somebody made intradermal tests on her arm and within fifteen minutes she was dead. In my opinion she should not have died and the clue to the whole problem was just one thing, the age at onset. This woman had had asthma since the age of seven, all her life. Obviously, the physician did not appreciate that her asthma had existed all her life and that that fact alone put her into the class of "allergic individuals." She had the "asthmatic

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state" which began early and persisted through her life. The age of onset is of great practical importance.

In most cases the reaction pattern is relatively uniform for the individual patient. We all have patients who have hay fever year after year: their "shock organ" is in the nose. We have others who have asthma: their "shock organ" is in the bronchial wall. Still others have eczema: their skin is more highly sensitive than other tissues. One has to think that there is not only a generalized basic fundamental disease, some disturbance of physiology or chemistry which explains the general picture, but also one has to consider some local tissue disturbance which explains why it is that hay fever occurs in this patient, asthma in another and eczema in a third.

The theories about this are numerous and there is nothing very new to add to them. The theory of endocrine disturbances has very little to support it so far as we know. As we look at them, our patients are short and tall, blonde and brunette, fat and thin; they have no gross pattern which would indicate hyper or hyperthyroidism or pituitarism or any other "ism." Zondek[1] made skin tests with estrone as well as with various other endocrine preparations, but he finds that the results are about the same in "allergic individuals" as they are in normal persons. Harkavy[2] has pointed out that in animals the phenomena of anaphylaxis can be inhibited by taking out thyroid, parathyroid, thymus and testes, but it can be enhanced by taking out ovaries and hypophysis and adrenals. These findings are true in guinea pigs. Whether they hold for man, Harkavy does not say. However, it is proper to continue to think of endocrine disturbances if only because our knowledge is still meager.

Dr. Pennington[3] has just touched on Selye's alarm reaction. Selye[4] defines it as "The sum of all biological phenomena elicited by sudden exposure to stimuli to which the organism is quantitatively or qualitatively not adapted." The alarm reaction is initiated by a stimulus and presumably the antigen-antibody reaction is the stimulus. When the stimulus is repeated and the alarm itself has subsided so that the blood pressure falls, the pulse falls, the patient comes into the stage of "counter shock." In that stage his organism is different. In theory his ability to produce carbohydrates has been increased until the supply is exhausted and his ability to produce protein for repair of damaged tissues has been inhibited. In this condition his "body reserve" is "depleted." Whether the pattern of the alarm reaction which takes place in "allergic individuals" is different from that of the pattern in normal persons is a question.

In another paper Selye[5] describes how the alarm reaction can be simulated by treatment of the animal with various adrenal cortex preparations of which the principal one is desoxycorticosterone acetate, "doca." Animals treated with "doca" display certain symptoms and signs which are interesting. The thymus and the pancreas degenerate. Ulcers may form in the gastro-intestinal tract. It so happens that I have seen recently two patients with severe asthma who did develop gastric hemorrhages. We thought the bleeding was due to the lesions of periarteritis nodosa, but perhaps after all it may have been simply a part and parcel of the same phenomena which Selye has described.

Nervous and psychic factors are important. Last winter I read a paper before the Academy of Allergy on "Depletion in Asthma." Everybody wanted to know what "depletion" was and I could only say that these patients had lost not only physical weight and strength, but they had also lost emotional stability and judgment. Treatment aimed to correct the "depletion" of both body and soul was often successful.

There are one or two figures which support the conception of nervous "depletion" as a factor in asthma. In a series of mental hospitals which had a total of 11,600 patients, Leavitt[6] found only ten cases of asthma and that is less than 0.1 per cent. One recalls that in 1943 Hyde and Kingsley[7] in the First Corps Area rejected only 495 men out of 60,000 for asthma and that was something less than 1 per cent. It looks as though asthma is much less common among insane persons than it is among normal healthy individuals. Dr. Cobb[8] has suggested to me that this may be due to the inability of the insane to produce another emotional reaction on top of the mental disturbance which he already has.

The broad study of the asthmatic state and of the allergic individual is of primary importance. We need many more studies to throw light in its nature and its mechanism.

HAY FEVER

Hay fever is the second subject which I would like to discuss. Hay fever is important because it is classically allergic. I see two parts to the treatment of hay fever. The first concerns the specificity of the treatment and the selection of the proper pollens. The second is the mechanism and the technic of treatment.

Specificity.—Many physicians treat their patients with mixtures of various pollen extracts. I am not at all sure that this is correct. I make skin tests on my patients with several different pollens and I find all sorts of positive reactions, some of which make sense with the clinical history and some of which do not. For example, I see many patients who have positive often handsome reactions to the grass pollens and yet who have no symptoms whatever in the months of June and July in New England. And ragweed is the same way: I have patients who show a good skin test to ragweed, but who have no trouble in August and September. Therefore, I say that the skin tests in themselves are, in my hands at least, not an accurate criterion of the pollens to which the patient is sensitive. There are too many positive reactions that are false and there are too many patients who are clinically sensitive but yet show no skin reactions at all. The skin test is a test of the skin; it may or may not reflect the sensitiveness of the nasal or bronchial mucosa.

During this past autumn it was possible to recognize two groups of patients, both of whom were at first diagnosed as having ragweed hay fever. In one group the onset of symptoms was in early August. The curve of symptoms reached a peak about Labor Day or shortly thereafter and then it fell off toward the end of September.

In the other group the curve is moved to the right. The onset was not until Labor Day. The crest was in early October and this crest was a long plateau rather than a peak. It was followed by a long slow slope which did not reach bottom until the end of October. In other words, it was possible to separate "ragweed" patients into two groups by their histories. Incidentally, a review of the record of what each patient did in 1944, 1943 and 1942 shows the same pattern and a fairly uniform behavior for each individual.

In a paper written in 1930, Smith and I[9] compared the incidence of symptoms with the incidence of pollen in the air and were pleased to find that the two curves corresponded. The data from which that curve was made consisted of a series of horizontal lines, one for each patient, beginning at the date of onset of his symptoms and ending at the date of recovery. Many of these lines corresponded to the true ragweed season, but some of them corresponded to the second group, to the curve on the right.

The point I wish to make is that the clinical history is, after all, the best index of the substance to which the patient is sensitive and which is causing his symptoms. Where the course of "ragweed" is atypical there are other factors besides ragweed. In our country in the middle and late fall these are the molds: Alternaria, Hormodendron, and so on. There are many different genera and in each genus are thousands of separate species. To discover which mold is actually causing trouble and to find out whether the one mold is causing trouble in many cases, or whether it is this mold in this case and that mold in that case seems to me almost a hopeless proposition.

In 1937, Randolph, Guba and I[10] wrote a paper concerning a plant pathologist who by occupational exposure had made himself very sensitive to a mold called Cladosporium fulvum. Skin tests with an extract of his own Cladosporium fulvum showed very much larger reactions than did tests with other species of the Cladosporium genus.

This demonstration of the specificity of mold sensitiveness is striking. It shows how very sensitive certain individuals may be to one particular mold while tests with other molds of the same species even though closely related may be negative. It is unfortunate perhaps that little attention was paid to this observation which to me is quite important.

Pollen surveys are interesting. In 1940, Pratt, Colmes, Fromer, Green, Chafee and Clapp[11] made simultaneous pollen surveys from five dif-

ferent places in the city of Boston. They found that the pollen incidence varied considerably from one location to another. Local factors such as peculiar air currents as well as neglected backyards appeared to be quite as important as the general pollen picture over the country as a whole. We need further studies of this sort.

The treatment of hay fever is a subject dangerous to discuss in this audience. Why is it necessary to administer a large number of doses to produce "immunity" in our patients? In the case of tetanus toxoid, of diphtheria toxin or of typhoid vaccine, immunity is produced easily and regularly with only two or three or four doses. We give our patients ten, fifteen and sometimes twenty or more doses each year. The reason is, of course, that the quantities that can be used in hay fever are limited by the reactions which they produce. The skin sensitizing antibody in the patient is so concentrated that the ragweed combines with it and produces systemic reactions. Whether we can learn to overcome the difficulty in some way, perhaps by subdividing the ragweed antigen to make a skin sensitizing fraction and an immunizing fraction, remains to be seen. So far, one must admit that the splitting of ragweed extracts has been difficult and unsatisfactory.

Loveless's[12] blocking antibody looks promising. The idea was originated by Cooke, Loveless and Stull,[13] but Loveless has gone on with it. If the blocking antibody is important, if it exists alongside of the skin sensitizing antibody, then that means two antibodies and that means two antigens. That supports the idea that the ragweed may have both a sensitizing factor and an immunizing factor in it.

ASTHMA

The pathology of asthma is a third important topic which I would talk about. In severe cases of asthma when the blood contains a large number of eosinophil cells and when there is evidence of hemorrhage in various places, the diagnosis of periarteritis nodosa is sometimes made. In other cases the x-ray shows areas of clouding which come and go sometimes in a few days' time. These areas are usually not so dense as real pneumonia; the patient is not very sick, although he may run a mild fever. The diagnosis of Loeffler's syndrome is made; it is not very uncommon.

Elsewhere, I[14] have described intrinsic asthma. It also is associated with a blood eosinophilia. Many of the patients, about half of them, have sinus lesions, inasmuch as the x-ray will show thick membranes in the sinuses and the pathologist will describe eosinophilia in the lining membrane, and nasal polypi form. The syndrome includes severe asthma with eosinophilia and with sinus disease.

More recently, one sees an occasional and rare soldier returned from the Pacific with "tropical eosinophilia." This disease was described two years ago by Weingarten[15] who collected some 60-odd cases in India and pointed to it as a tropical disease. There is one very interesting thing about tropical eosinophilia and that is that arsenic, whether given as neoarsphenamine intravenously or given as carbarzone by mouth, is almost specific for it. The relief following arsenic is not immediate; the patient sometimes requires a course of treatment over a period of two or three weeks before relief will really come.

This last February, 1945, there was a very interesting paper in the London *Lancet* by Apley and Grant[16] in which the authors compared these different clinical pictures suggesting that they might be all parts of a common principle. They said that intrinsic asthma, periarteritis nodosa, Loeffler's syndrome and now tropical eosinophilia had so much in common that they might well be part and parcel of the same picture, that they all had asthma, they all ran a chronic course, they all had fever and they all had a high white count with a high eosinophil count. Eosinophils could be found in the nasal secretions. Periarteritis nodosa was characterized by the evidence of hemorrhages in various parts of the body, purpura on the skin, serous effusions and blood in the urine. Loeffler's syndrome was characterized by transient pulmonary infiltrations. Tropical eosinophilia had no particular characteristic except for the extraordinary eosinophilia itself.

Whereas each of these components had characteristics of its own which were quite distinct, yet it was perfectly fair to consider them as parts of a single process and perhaps assume that in each disease the special manifestations

were emphasized above the other several manifestations. I would certainly support this suggestion of Apley and Grant and consider that these clinical states were all in the same group.

The lesions of periarteritis nodosa are caused by a wide variety of toxic agents as Rich and Gregory[17] have shown. It seems to me much wiser to regard it as a special pathologic picture which develops from a variety of causes incidental to the basic disease, than to be content with the two words as a final diagnosis.

In summary, one can say that in severe asthma one may find lesions of blood vessels in wide variety: infiltrations in the lungs, ulcers of the stomach and eosinophilia as well as the usual emphysema and the polypoid sinusitis. Obviously, there must be a basis on which we can correlate any one of these things with the others. To find this basis should be the ultimate goal for our work. In the meantime, arsenic which is effective in tropical eosinophilia has not been tried in asthma, and why not?

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THE DISABLED, THE PHYSICIAN AND EMPLOYMENT*

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I am particularly grateful for the opportunity of talking to you at this first meeting of the Section on Industrial Medicine and Surgery, for you in this group are concerned with safety, accidents, selective placement of the disabled, and other problems involved in the rehabilitation of the handicapped for normal productivity.

Last year at this meeting I had the privilege of reporting to you on the Army Air Forces Convalescent Training Program, what it was, how it came into being, our objectives, how it operated, and what we felt had been accomplished.[1] Today I am happy to report to you that that program is still in operation and it is the plan of the Army Air Forces that it be continued as an integral part of the medical services of the postwar Air Force.

As I pointed out to you last year, the objectives of the Convalescent Training Program originally were two-fold: first, to send the soldier-patient back to duty in the shortest possible time in the best possible physical condition; second, to teach the soldier-patient something which would make him a more efficient and effective fighting man. Our experience up to 1944 had largely been with the precombat trainee, the man preparing for battle, with but limited experience with casualties from overseas combat theaters. During the past year, however, as the war reached its climax the number of men returning from combat, physically and emotionally broken by battle, sickness, fear, nostalgia, boredom and regimentation, has greatly increased.

Based on our observations of the medical, physical, psychological, vocational and social

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needs of men returning from overseas combat, it was evident some time ago that the Convalescent Training Program as carried on in AAF regional and station hospitals for the precombat trainee, was not designed to meet the needs of these men. So in September, 1943, a number of special AAF convalescent hospitals were activated. Originally known as convalescent centers and subsequently renamed "convalescent hospitals," they were at first attached to existing operating hospital facilities. But as the increased need and the desirability of operating such facilities as independent units became apparent, the convalescent hospitals were relocated, often taking over an entire army post.

Operated by the AAF Personnel Distribution Command, these hospitals provided convalescent service programs designed to meet the needs of the whole man, whatever those needs might be. They were designed to take men back to their jobs after definitive medical care. Every effort and skill was centered on the task of reconditioning as many men as possible in the following sequence of possibilities: (1) return to an AAF assignment in original military occupational specialty; (2) return to an AAF assignment in a new military occupational specialty compatible with civilian and military education and experience, and physical condition; (3) return to civilian life as self-sufficient individuals, both socially and economically; (4) discharge to the Veterans Administration.

For the soldier-patient who was to return to duty status there was an intensive program of physical rehabilitation, educational training, psychological readjustment and resocialization. Men were brought to the peak of physical fitness through competitive team play, progressive and graduated calisthenics, and active recreation which included athletics, bicycling, horseback riding, fishing, swimming, hiking and skiing. Military training was provided for further specialization in the majority of military occupational specialties applicable to the Army Air Force.

In addition to class and individual instruction in such subjects as administration, clerical training, supply, teletype operation, radio, graphic arts, navigation, link trainer, gunnery, aircraft mechanics, automotive repair, photography, and sheet metal work, practical experience was provided by "on the job" training in these subjects.

Patients also had opportunities to enroll in numerous academic classes, shop classes and hobby groups. Through the United States Armed Forces Institute, and nearby local educational institutions, many of these courses were taken for high school and college credit. Journalism, radio broadcasting, dramatics, art, handicrafts and many other avocational activities were more than diversional in that they provided the media, along with well rounded and complete recreational programs, for psychological adjustment and resocialization.

By providing the soldier-patient with a laboratory of opportunity through physical reconditioning, educational-avocational pursuits and recreation, we found he would regain those lost traits necessary in normal behavior patterns. By stimulating interest and motivating the patient to participate in such activities, his center of interest was transferred from himself to the activities in which he participated with resulting adjustment and resocialization.

In our AAF convalescent hospitals each soldier-patient was assigned to a personal physician who became his "family doctor" for the period of his hospitalization. This personal physician had a paramount place in the hospital. He was the captain of the team of medical specialists, physical therapists, educators, athletic trainers, occupational therapists, social service workers, personal counsellors and vocational experts, and as such, integrated their efforts in the treatment of the whole man.

The latest in physical rehabilitation technics, use of prosthetic devices, teaching of factors inherent in daily living, and skills needed by those who had physical and psychological wounds, were available. All personnel were carefully selected on the basis of experience and demonstrated ability, and many were given special training at the Institute for the Crippled and Disabled in New York City, and at seminars conducted by the Office of the Air Surgeon.

For the men who were to be separated from the service, there was, in addition to the physical reconditioning, educational training, psychological readjustment and resocialization opportunities, a complete program of vocational guidance

based on achievement, aptitude and function testing, and interests determined by a series of short work experiences. In these short work experiences, under a staff of experienced vocational instructors, the patient had an opportunity to participate in a diversified educational program embracing academic subjects, commercial skills, photography, art, woodworking, welding, metal shop and machine shop practice, automotive repair, and a host of similar fields.

The man learned not only what he liked to do, but he learned what he was able to do, both in terms of ability and in terms of his handicaps. He knew at the end of this period what he enjoyed doing and the occupations for which he possessed aptitudes. This information was then correlated by a skilled vocational counsellor with the job opportunities in the field chosen, and the patient, upon discharge from the hospital, had a complete objective vocational profile of himself.

Now that the actual fighting is over, our number of incoming patients to these convalescent hospitals has been cut off. When those patients now in convalescent hospitals have had the maximum benefits of this program they will be discharged either to civil life or to the Veterans Administration. The convalescent hospital was designed to meet a specific need; when that need no longer exists, the convalescent hospital will probably be eliminated or materially reduced in size.

This experience with the convalescent hospital, however, has given us an unusual opportunity for clinical studies in rehabilitation and convalescent care. From it have evolved certain principles and knowledge which should be of real value to both the military service in future years and to postwar civilian medical care. The military services have recognized the value of that knowledge and experience, as is shown by plans to include planned convalescence and rehabilitation in the postwar medical service. The implications for civilian medical practice appear to be even greater.

During the past two years there has been tremendous interest in rehabilitation and convalescent care. A part of this interest springs, I am sure, from the experience of the military services. The rest springs from some of the excellent studies which have been done on the subject. This has been particularly true in the field of bed rest, where much material is already accumulating, with many additional studies currently being carried on.

Keys[2] working with conscientious objectors and studying them under carefully controlled conditions of complete bed rest for six weeks, has noted in his preliminary observations, that these individuals' reaction time is reduced approximately 5 per cent, that coordination is markedly decreased especially in the proprioceptive sense, that blood volume is reduced from 10 to 20 per cent, and that there is a reduction on the average of 11 per cent in the size of the heart. He noted in a standard work test, after a six-week period of bed rest, that there is a reduction of cardiac effectiveness with a relative tachycardia, both at rest and in work tests; work formerly done with a pulse rate of 125, on the first day after prolonged bed rest required a pulse rate of 170. He noted further that it takes a period of up to sixty days to recover a normal pulse response for the same work load. A mounting pulse rate even at complete bed rest under basal conditions was also observed, pointing to the deconditioning of the myocardium. Keys also noted that it is very difficult to keep the patient in positive calcium balance, especially during the early days of bed rest, and that more than twice the amount of protein in the diet is necessary to keep the patient in normal nitrogen balance. There is also a marked increase in the urinary output of thiamine and vitamin C.

Barr[3] and his associates have found in general this same phenomena plus a marked hyper reaction to the tilt table.

Powers and Whipple,[4] at the New York Academy of Medicine a few weeks ago, reported two series of surgical patients on early ambulation, and by early ambulation they meant up and about on the first or second day. Powers reported 500 patients and Whipple reported approximately 1,000. They varied from simple appendectomies to subtotal gastrectomies. A large number of cases of biliary surgery were included in Whipple's series. The following is a broad summary of the results.

Patients who were given early ambulation averaged five days less hospitalization. In Power's series they got back to their usual job

four weeks earlier than the parallel group who stayed in bed the conventional length of time. They required less than half the amount of sedation than in the late ambulatory group. The postoperative complications were diminished about 50 per cent in the early ambulation group. They went on regular diet the second or third day. Enemas were cut about 80 per cent. No patient on early ambulation required catheterization after he got on his feet.

Another rather interesting report in this same general field has been made by Karpovich, Weiss, Starr and Ershler,[5] on physical fitness testing and physical training on convalescent rheumatic fever patients. Because of the chronic, recurrent nature of the disease, and the possibility of disability from cardiac sequelae, it was felt that special emphasis must be placed on the standardization of physical activity and convalescent training for these patients, by standardizing a group of graduated physical fitness tests which could be used, in conjunction with clinical observation, to determine the rate by which the patient could safely be permitted to progress to successively more strenuous physical activity.

Using a modification of the Harvard Step Test with two benches, 12 and 20 inches in height, and a cadence of twenty-four steps per minute, physical testing was started when, in the judgment of the medical officers, the patient should be permitted to be out of bed in a chair.

The first test involved twelve step-ups in thirty seconds, using the 20-inch stool. In this test it was found that body metabolism in the average individual was raised eight to ten times. If the test was passed, the patient was placed on a program of graduated ward calisthenics. These exercises were given for ten minutes twice daily to start, and continued over a period of approximately three weeks; they were then increased to thirty minutes twice daily. The exercises used at the start of this program have been found to raise body metabolism roughly three times. The degree of the exercises during this period was gradually increased to a level which raised the metabolic rate seven to nine times above normal.

The next level of physical fitness testing was designated the progressive test, consisting of twenty-four step-ups per minute to a 20-inch bench for a period up to five minutes. Scoring was based on the duration of the exercise, plus the pulse rate one minute after exercise. If the patient made a minimal passing score on this test, and the medical officer in charge concurred, he was placed in the barracks phase of the program, with a minimum stay of two weeks in each of four periods. In the first period, physical training was given for forty minutes daily; in the second phase, fifty minutes daily; in the third, seventy minutes daily; and in the final period, for ninety minutes. The intensity of these exercises was increased in each period and progressions were made only with the concurrence of the medical officer in charge. Progressions from period one to period two were automatic after two weeks, but progression from period two to period three were dependent upon the score made on the progressive date. There was no recurrence or any untoward reaction in the patients who were tested in the study.

The program in the armed services has demonstrated what can be done for the physically and emotionally wounded and handicapped to make them self-sufficient, self-respecting, employable persons. This has further been enhanced by the remarkable record of the handicapped and disabled in industry during the war.

Both the medical profession and the general public are genuinely concerned with the problems which must be faced by the thousands of our disabled veterans as they return to their communities. These men have earned and deserve the best that a grateful nation can give them, but few of us realize that in comparison to the total numbers, our disabled veterans constitute only a small part of the handicapped and disabled we have in this country.

We had in 1940 in the United States some six and one-half million disabled males between the ages of 15 and 64 years, men who normally would be income-producing.[6] These six and a half million, plus the number of disabled or handicapped veterans being discharged from our military hospitals will give us, when demobilization is completed, approximately eight million working age males who are disabled to the extent of requiring physical or vocational rehabilitation or special placement aids, if they are to be successfully employed. This rep-

resents one person in sixteen in our general population, and one in seven in our male working population. The number of persons who are permanently disabled by accident alone increases by 350,000 each year.

During the first four years of war there were approximately 17,000 amputations in the Army, but during this same period there were 120,000 major amputations from disease and accidents in our civilian population.

The armed forces and some outstanding community and civilian agencies such as New York's Institute for the Crippled and Disabled, have demonstrated that the physical and emotional rehabilitation of our handicapped and disabled is possible. Some authorities have estimated that up to 97 per cent of all our handicapped can be rehabilitated to such an extent that they can be gainfully employed.

The short labor market during the war gave many disabled persons the first opportunity of their lives to take a place on the production line and prove that they could, with good selective placement, produce on a par with the normal workers. An example is the Ford Motor Company River Rouge Plant where more than 11,000 handicapped civilian workers were employed.

During the war, 83 per cent of our nation's industries employed handicapped workers. Those industries have reported that among the handicapped there has been a much smaller labor turnover, less absenteeism, fewer accidents and equal or higher production rates. Many employers before this vast experience with handicapped employees, had a fear of increased accident rates. The industrial accident rate of 87 of the great industrial plants in America, each having from 50 to 12,000 handicapped employees, has disproved that theory. Their reports show that 56 per cent found the accident rate for the handicapped lower than that of the able bodied; 42 per cent found the rate the same as for the able bodied; and only 2 per cent found it to be higher.

The answer to the utilization of handicapped workers lies not so much in "fitting the job to the worker" as in "fitting the worker to the job." Through this procedure the worker in reality becomes non-handicapped as far as his particular job is concerned. It is not a matter of coddling but one of proper placement. The worker is fitted to the task and knows a full day's work is expected of him.

Most individuals use less than 10 per cent of their potentialities in normal pursuits. It is only in emergencies that we call upon our tremendous reserves of physical power and ability. In many cases a worker's physical defect acts as a tremendous stimulus to overcompensation, resulting in extraordinary physical ability. Adler developed a complete system of psychology on the basis of inferiority. He believed that the successful, the efficient and the aggressive individual was one who was compensating for some inferiority. The employer of handicapped workmen is putting that psychology into purposeful and gainful application.

A survey completed in a number of Westinghouse Electric Company plants disclosed that approximately 19 per cent of the occupations could be performed satisfactorily by persons having only one leg, 17 per cent by operators who must use crutches, 83 per cent by men with only one eye, and 82 per cent by the deaf. Although much work still needs to be done in analyzing the physical requirements of jobs and physical capacities of workers, the United States Employment Service has developed adequate tools and technics to meet the needs of the bulk of our handicapped population.

The work of the National Office of Vocational Rehabilitation has shown how rehabilitation pays off economically. Of the 43,997 persons undergoing vocational rehabilitation under this agency in 1944, 22 per cent, or more than 10,000 had never been gainfully employed and nearly 90 per cent were not employed at the time they started their rehabilitation. The average annual wage of the entire group prior to rehabilitation was $148.00. After rehabilitation, the average annual wage of the group increased to $1,768. The total earnings of the entire group rose from $6,510,556 to $77,786,696.[7]

Prior to rehabilitation the majority of these persons relied on general public assistance, not only for the disabled individual but also for his family. The annual cost of this assistance to the taxpayer was from $300 to $500 per case, but the total cost of their rehabilitation averaged only $300 per case, a non-recurring expenditure.

No degree of economic gain, however, can measure the social and moral satisfactions obtained by the successfully rehabilitated and employed handicapped worker and his family. Nor can it measure the value to society in the transformation of these individuals from dependents to productive, self-reliant individuals. With adequate rehabilitation, a disabled person retains his self-respect and becomes self-supporting; industry saves pensions, labor saves valuable workmen; government has more taxpayers, relief rolls are reduced, and our democracy maintains its economic levels.

The handicapped proved their worth during the war and were lauded by industry for their efforts. But what happens now? As production is being cut back, industry is dropping large numbers from its payrolls. Demobilized veterans are returning from the war in increasingly large numbers, and more employees have to be released to make room for the veterans who not only deserve jobs, but have them guaranteed by law. Dismissals are on the basis of seniority and the disabled being the last to be hired, are among the first to be dismissed.

The handicapped worker, after enjoying a period of economic prosperity, suddenly finds that the labor market is loosening and that jobs for which he can qualify are no longer available. Greater production during the war allowed industry to break job structures into small components, but now as production is being curtailed, the average worker, instead of doing one small highly specialized task, finds he must be able to do several. This demand for greater flexibility on the part of the worker further reduces the employment opportunities of the disabled. During the war the job was adapted to the worker; now the worker must be made to fit the job. The only answer lies in rehabilitating the worker.

The record of the federal-state rehabilitation programs under the Office of Vocational Rehabilitation has been heartening, but when it is compared to the one and one-half to two million persons who are in urgent need of such care, it is woefully inadequate. The question usually raised is: "If the vocational rehabilitation program has been successful with this small group, why are not the remaining million and a half to two million given its advantages?"

The answer is that there simply are not enough rehabilitation centers in the country to which these cases can be referred. The state and federal rehabilitation programs do not do the actual physical restoration and vocational retraining of these people. They supply the funds, help select a suitable vocation for which the person possesses both aptitude and physical abilities, and supervise his retraining. The actual work, however, is done by other agencies. These agencies may be public or private schools, trade schools, apprenticeship training courses, rehabilitation centers, hospitals, group clinics, or other medical facilities. Those who possess the necessary skilled personnel and facilities to do an adequate job of physical restoration and retraining to rehabilitate cases vocationally, are so few in number that opportunity is denied to the large majority of our disabled population.

The funds and authority are available, but the facilities equipped for doing the actual job of rehabilitation are inadequate. Several national organizations are making efforts to stimulate public interest in rehabilitation by demonstrating to both the medical profession and the public, what actually can be done by an integrated program of physical, mental and social vocational adjustment.

One such group is the Baruch Committee on Physical Medicine which is translating the experience of the armed forces in rehabilitation into its civilian application,[8] in order that this experience may be made available to the medical profession and those interested in community rehabilitation centers. They are blueprinting a model center, outlining its mission, organization, components, physical set-up, and its relationship to the medical and allied professions, industry, labor, social, and governmental agencies, and to the community as a whole.

The physician specializing in problems of industry plays a unique role in rehabilitation. Adequate programs designed to take men from the bed back to the job will not only save the worker as a producing member of the community, but can save industry tremendous sums from compensation claims. A few dollars spent on retraining and rehabilitation, as has been shown, pays high dividends. In plants in smaller communities part-time rehabilitation assistants can make valuable contributions. The athletic

director in the school, vocational teachers and other trained members of the community can be organized to do a functional team job on a part-time basis, working under the direction of an industrial surgeon to give a limited but most valuable rehabilitation program.

Many returning veterans have had invaluable in-service experience in this field, and are eager to continue in the field of services to the handicapped. The National Society for Crippled Children and Adults[9] has set up a personnel roster of service-trained persons, and is acting as a clearing house between the individual and the community to aid in meeting the needs of both.

Rehabilitation presents a new challenge to industrial medicine, a challenge that will pay great dividends to both the worker and industry, dividends measured not only in dollars, but in improved industrial relations, increased production, and most of all in the salvaging of individuals from the scrap heap of invalidism and transforming them into self-respecting and self-supporting citizens.

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DISCUSSION (*Abstract*)

Dr. D. A. Henderson, Charleston, W. Va.—In the booklets which Dr. Rusk has, there is mentioned the checking of the boys. What was the criterion of bed rest? It is an uncertain term. I wonder what Dr. Rusk means by bed rest.

Dr. Rusk.—In this series, the patients were kept flat in bed, except that they were allowed up once a day for a bowel movement. In the Cornell cases they were put into a body cast that extended from the umbilicus down, but was cut in a half-shell. They were lifted out of the cast at least every other day for a bowel movement; otherwise they were kept at complete bed rest.

In the Cornell series there was more complete rest than in the other series. In the other series, the patients about in bed at will.

Dr. A. Wiley, Dayton, Ohio.—I would like to ask Dr. Rusk what suggestions he has for each company in determining what jobs it can use for taking these men from one stage to another. What time, study, or job analysis is actually needed when a man is told that he can go from one stage to another?

Dr. Rusk (closing).—We were working when the war ended on a correlated series of tests. This is a physical profile which includes twenty-five different simple tests, to show duties that can be performed.

There is a new series of objective tests that is going to be published soon by Deaver and Gherman, using a new simple torque wrench to measure accurately strength, motion and ability.

We hope in the next year or two that we can do enough research on this so that possibly we will get a standardized procedure that could be accepted by industry for testing the handicapped, and also, by the same token, will measure their improvement.

I neglected to say one thing. I think you could make tremendous use of the physical educator in rehabilitation, not only in the program for the disabled but also in the general plant program of athletic activities. These men have all had some training in correctives. If you have not a full-time man, the director of athletics or the high school coach on a part-time basis can help the physician tremendously in the physical retraining and rehabilitation procedures.

We have used large numbers in the service, and many of them would be very much interested to continue on in some part-time basis because they see the great need for such a program.

INDUSTRIAL HEALTH: A REPORT FROM THE FIELD*

By CARL M. PETERSON, M.D.†
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I understand it to be my function to report to you in a brief way some of the things which have been accomplished by medical organizations in trying to meet the obligations and added functions which are in the province of industrial health, as outlined by your chairman, Dr. C. W.

*Read in Section on Industrial Medicine and Surgery, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.

†Secretary, Council on Industrial Health, American Medical Association, Chicago.

Roberts. Dr. Roberts, by the way, was a charter member of the Council on Industrial Health, and much of the content of our program and the way we have approached these problems, stem directly from his guidance and from his inspiring example.

Our program in the American Medical Association is roughly divisible into three parts. The first of these deals with public relations. Under this heading, we include contacts with government agencies, with management and insurance, with labor and the public. We try to represent fairly to them what we believe acceptable standards of medical service in industry should be. We look to them also to accept equal responsibility for creating a demand for good industrial health programs. The second aspect of our work can be conveniently classified as scientific advancement. These activities have to do with progress in clinical industrial medicine and surgery, evaluations of current practices, statistical reports and research into all phases of industrial hygiene and toxicology. Our third and principal activity is professional relations, which we subdivide conveniently into medical organization and medical education.

Nearly every state in the Union has a committee on industrial health in its medical society at the present time. That same sort of organization is gradually being extended down into counties. These state and county medical societies have been an enormous factor in extending the principles which Dr. Roberts has discussed. To be sure, some of them have been much more active than others. That, of course, is in the general nature of things, but the field activities of the Council have been centered in these agencies and have been attended by a very considerable degree of success.

Educational programs have been set up in these state societies. State journals have assigned more space to industrial health, and interesting experiments have received strong medical support. In one case a tabloid is issued once or twice a month, and it contains each time a significant health education message, whether it has to do with chest examinations or a venereal disease campaign, or heart disease, or whatnot. Always there is authentic information provided by one of the established agencies in the field. This tabloid has been received in a very responsive way by workers in a great many of the small plants in Brooklyn. An added advantage has been the development of labor-management health committees in these plants, which have the joint function of discussing all health matters and of developing more extensive industrial health coverage in whatever direction that might take, whether physical examinations, the introduction of a medical department in the plant itself, the employment of a nurse on full or part time, or the employment of a physician, full or part time. That, of course, epitomizes the whole development of industrial medicine. That is usually the way the services have grown up.

In another area, in nearby Astoria, the health department and the medical society have used a slightly different approach. They have provided public health nurses who are assigned to individual plants who agree to meet certain standards. These standards are that the whole plan shall be under responsible medical guidance, that there shall be good records available in the plant as a measure of the need for certain types of medical care, and these reports shall be periodically investigated by the health department and medical society as a measure of progress. This idea has met with such success that a good number of small plants have gone into it to a much greater degree than they might have otherwise. These are examples of what happens when a county society is stimulated by proper leadership. Experiments and extensions of medical service are constantly occurring in this field, about which we are trying to collect and disseminate information, and to see in what directions we can make additional progress.

We have also taken advantage of the structure of the American Medical Association by working with our scientific sections. All of you who represent specialty groups realize to what extent they are involved in the industrial picture. The dermatologist, for example, the traumatic surgeon, the orthopedic surgeon, the ophthalmologist and a great many others, are frequently consulted in the care and management of industrial disabilities. We have attempted to set up in each one of those sections a committee which will reflect that particular specialty's in-

terest in industrial medicine, and will give their own membership a better realization of the possibilities in the field, and to do whatever else is necessary to improve the standards of medical accomplishment. Many of these sections have made excellent progress and contributions. We attempt to publish reports periodically as representative of what can be accomplished along these lines.

Other professional groups have a real stake in this whole field. Dentists, for example, have similar responsibilities and similar problems. They have set up in their national and local societies the same sort of machinery that we have set up. There is the need always to establish the closest kind of professional contacts with them, and in many instances, to provide guidance and help so that they can arrive at the same goals we are attempting to reach. The same relations exist with nurses, with nutritionists, with engineers and technicians. The industrial hygiene engineer is one of the strongest co-champions we have in the field of industrial health. He represents the same general relationship which the sanitary engineer does in ordinary public health administration. Where the sanitarian is interested in the hygiene of water supplies and food supplies the industrial hygienist is essentially interested in the hygiene of the air, sanitation of the breathed atmosphere.

In addition to these organizational matters, we have conceived our function as pretty largely an educational one, educational in a number of different ways. We have a certain amount of leadership to exercise in the direction of public health education, or perhaps health education of the public is a better expression, and also to stimulate in any way we can the very obvious interest that labor and management have in the setting up of industrial medical services.

But our real obligation, of course, is to train our own people, our own colleagues. That has been a rather difficult chore. We have tried now for some years to make a real impression upon undergraduate training, because contrary to most opinion, the industry in America is not large industry; it is made up of large numbers of small plants that employ fifty to a hundred or two hundred people. These plants depend upon community practitioners, who devote a small amount of their professional time to industry. They ordinarily have not had any special training in these fairly involved preventive medical technics. Nevertheless 85 per cent of the amount of medical care which industry receives is provided by private practitioners and not the full-time medical staff that you see in a large corporation. It is a matter of real interest to us to see what we can do about injecting some orientation in undergraduate teaching so that every physician will have some realization of the medical problems which industry presents.

Right now there is a surprising number, gratifying to us, of course, of men coming home from the services who are expressing interest in making a career of industrial health. They are asking us, "Where is it possible for me to get training? What are the professional values in this work? What are the rewards in the form of satisfying work? Where can I locate? Where are the opportunities at the present time?" Modern industrial health is so young that it has not developed the type of graduate training which is representative of many of the other special disciplines. If you want to be a dermatologist, of course, you have ample opportunity to take a fellowship or a residency in an approved hospital, and at the termination of a certain length of time you are eligible for certification. That situation does not exist in industrial medicine, much to our concern, and it is an objective toward which we are driving as rapidly as we can. There is certainly an urgent need for short courses, refresher courses introductory in character, for these men. Many of them could be placed quite promptly at the present time. And there will, of course, be greater opportunities as industrial medicine expands postwar as we feel confident that it will.

One step of genuine significance has been taken recently in the industrial medical education program of the American Medical Association through the approval by the Board of Trustees of a Journal of Occupational Health. The first issues will be ready for distribution after the first of the year. This represents a tremendous step forward.

We have had a number of interesting contacts, as time has gone on, with other agencies

which are interested in the promotion of certain phases of industrial health. For example, the Council concluded very early in its career that prevention was the ascending star in the field, and that clinical care was on the descending phase. That is quite obvious, of course, because as we improve our methods of prevention the necessity for remedial services, by the same token recedes. That is not to say they are not important; they will be tremendously important for many years to come. But the mainspring, the foundation of prevention in industry, as it is in any type of public or group medicine, is proper physical appraisal, physical examination. Physical examination in industry has had a rather checkered career. For many years it was actively, bitterly opposed by labor unions. We concluded that the only thing to do was to formulate a set of standards which would be professionally adequate, and which at the same time would be acceptable to the employer, on the one hand, and the employee on the other.

We did evolve such a standard. It was not particularly difficult to evolve the professional side of the picture. That, of course, would not be difficult for any physician who has had any experience at all in physical examination. We did have some problems to overcome in the use of those records. Curiously enough, labor which was rather actively opposed at the outset, became increasingly cooperative when it realized that we were sincerely interested in formulating a genuine physical appraisal procedure which would be used not to exclude anyone from work, but as a basis for the placement of that individual in the kind of work that he could do to the best advantage of himself and of management.

The work of the Council, of course, stems to a very considerable degree from the statutory requirements of compensation laws, and there again we have realized that something needs to be done in order to inject some measure of uniformity in medical standards, medical requirements, and the administrative and judicial decisions which are rendered in this field, all of which are chaotic beyond description as you all well know.

We have attempted to use the same approach, the same avenue of joint discussion of these problems that we did in the physical examination field, and we now have about consummated a national commission on workmen's compensation which will include representation from the Council on Industrial Health, from the casualty insurance organizations and from the administrators of Workmen's Compensation as represented by the Executive Board of the International Association of Accident Boards. We have, as you can well imagine, hundreds of problems which could logically be discussed before a group of that kind, and we very confidently feel that this development will be one of the major accomplishments of our Council up to the present time. We still have to submit the program to the Board of Trustees and the House of Delegates, but I feel confident that they will recognize the advances which are possible through this joint discussion. Since every action that we take will have to be ratified anyway, it seems to me only logical to expect that this whole idea will receive full approval.

We are deeply involved in the rehabilitation picture. The subject is to be covered later in the program. Rehabilitation has always been a factor in industrial medical relations. The prompt, adequate management of the industrially injured has been a function of the industrial physician for as long as there has been industrial medicine.

The objective has been that the surgeon is expected to treat the injured man promptly, effectively and efficiently, and get him back as soon as possible to his old job and to his old rate of pay. That has been the objective, and we have measured our successes or failures according to that base line. All of these factors are of major importance to the medical profession because of the added impetus of the disabled veteran. It will be many a long day before we have finally solved this problem even from the purely reconstructive phase of veterans' rehabilitation, to say nothing of the regular increment of disabled persons which derives from industry, and from home, farm, and road accidents. Any development in rehabilitation must be recognized as one of the prime responsibilities, the most important matters affecting the medical profession today. We propose to set up a clearing house which will provide physicians with information about what is transpiring in the rehabilitation field, what

is to be expected of them either from the point of view of the veteran in the veterans' projects, or the federal-state program sponsored by the Federal Security Agency. We have the feeling that the committees on industrial health which we have set up in the states should keep aware of all states rehabilitation activity, and be in position to report and act upon developments promptly and effectively.

There are, of course, many other aspects of the work of the Council which I would like very much to tell you about. It would take a good share of the afternoon. I want to bring you a message of congratulation from the Council on Industrial Health. I feel certain that this Section, once it realizes its full potentialities, will exercise as much influence in the Southern Medical Association as does any other similar group. In no other field are there greater possibilities for improved medical standards or for improvements in the distribution of good medical service.

COMMON SKIN DISEASES IN CHILDREN*

By LEE BIVINGS, M.D., F.A.A.P.
Atlanta, Georgia

Skin diseases, probably because of their obvious presence to patient, friend, and critics, assume a role of major importance in the eyes of all mothers.

Therefore a discussion of diagnosis and treatment, especially where the latter can be modernized, does not seem amiss in such a gathering.

DIAPER RASH

Among the most frequent, often very early in life, appears that very intense and sometimes difficult dermatitis of the skin of the buttocks areas known as diaper rash. Its most satisfactory explanation seems to be in the assumption that the proteus bacillus liberates free ammonia from urea in the urine during the long hours of the night when diapers go unchanged. Its relief would then be, first, to eliminate or control the proteus bacilli by sterilizing or the inhibiting action of a weak bichloride of mercury solution, usually one tablet to a gallon, as the last napkin rinse, the napkin being allowed to dry with the bichloride solution present in it. Second, the treatment and protection of the intensely irritated skin by the use of some soothing paste. My favorite has been for years a paste made of powdered corn starch mixed with white vaseline for thickness and body. This applied freely at bedtime and during the day gives the skin a chance to heal while the source of the ammonia is removed by the inhibiting action of the bichloride.

At infrequent intervals one will encounter a skin so intensely sensitive to mercury as to result in a severe mercury dermatitis following the napkin rinse in bichloride solution. Such a skin reaction usually promptly subsides with the elimination of the bichloride rinse of the diapers.

IMPETIGO CONTAGIOSA

Probably next in frequency and early occurrence in infancy comes impetigo especially of the bullous variety. A plague and curse of hospital nurseries, it is often difficult to eradicate. In the newborn infant it frequently occurs as pustules under the napkin to spread rapidly to other areas of the body, especially in folds of the skin around the neck, axillae and groins. Fever is not infrequent and on rare occasions nephritis may occur even from apparently small lesions. Septicemia can be a very serious complication. It would seem that too generous use of oils and ointments in the folds of the skin in our warm climate would seem to predispose the skin to infection. Some dermatologists stress the value of soap and water in treatment of all skin infections and it seems especially applicable in bullous impetigo. Removal of all blebs and dead skin by gentle but generous use of soap and water is the first prerequisite of the treatment I have found most useful. Then apply a powder made up of 25 per cent sulfadiazine and 25 per cent sulfathiazole in powered corn starch. Apply with a ball of cotton like a powder puff to the raw surface twice daily.

Emphasis is made upon the thorough removal of all blebs and dead skin or crusts before using the sulfa powder. The absorption of the sulfa drugs apparently is very slight when used

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in powder form and I have never seen ill results from its use in the above manner.

There are many other useful antiseptics for treatment of bullous impetigo and one of the most successfully used in our nurseries, especially in severe cases, is penicillin, 12,000 units intramuscularly every three hours until the infection subsides.

In the crusted type of impetigo commonly known as "summer sores," the treatment outlined above using soap and water and sulfa powder seems equally effective.

FURUNCULOSIS AND STYES

With the advent of hot weather all skin infections increase sharply. It would seem that certain individuals, even certain families because of a lack of specific skin immunity have a marked tendency to have recurring furuncles and styes summer after summer. Involvement of the external auditory canal is one of the most painful and, until recently, one of the most difficult to treat. Styes apparently belong in the same category.

Local treatment, except for comfort, seems to be of little value. An exception might be made for the use of wet dressings in an acutely inflamed and draining single or multiple headed furuncle.

By far the most successful treatment I have found is the intradermal injection of staphylococcus toxoid in doses of one-tenth to one-fifth cubic centimeter repeated at two- or three-day intervals for, usually, three or four doses. It seems a logical procedure if we accept the theory that a lack of individual immunity is the underlying cause of the appearance and reappearance of the disease in a susceptible individual. The treatment is usually but not always effective. When it fails an autogenous vaccine usually will give sufficient rise in immunity to cause a cessation of the recurring furunculosis although either treatment may have to be repeated the following summer until the child develops sufficient natural immunity to protect him.

SEBORRHEA

In many young infants, usually beginning about the first month of life, there appears in the scalp a scale, more likely to be avoided over the anterior fontanelle, which if neglected can become a severe and crusted dermatitis of the scalp with purulent exudate and occipital adenopathy. The frequency of its occurrence in infants who have the best and more exacting hygiene leads one to the assumption that again the underlying cause is a lack of immunity in the young infant to protect his skin against infection. It can be removed with some difficulty with soap and water to reappear the next day unless the removal is thorough and followed by energetic massage into the scalp of some antiseptic. The most useful and effective agent I have used is two per cent ammoniated mercury in a base which is not greasy. A few applications seem to get the infection under control and as the infant develops natural immunity the disease disappears. Again soap and water is a most important preliminary to successful treatment of a skin infection.

INTERTRIGO

Not so frequent but often persistent and discouraging to treat is the cracking of the skin in folds especially the groin, which seems to be due to overenthusiasm in the use of oils and greases on the skin in areas when air cannot have free access. Unless a purulent condition has followed as a complication the use of dry pastes or soap and water followed by talcum powder seems very effective treatment.

In the climate of the Southern states it has been my observation that the skin of young infants, especially in summer months, remain free of irritation and infection if oil is not used at all or very sparingly with the generous use of soap and water followed by plentiful talcum powder. This seems particularly true if areas of the body where there is poor ventilation of the skin such as folds around the neck, the axillae and groins.

In treating the sensitive skin of children it is always safer to under treat than over treat. Strong ointments should be avoided as should strong concentrations of drugs in any vehicle.

Soap and water are probably the best and most effective single remedy in the treatment of skin infections in children.

20 Fourth Street, N.W.

PRE-MEASLES ENCEPHALITIS*

By Jay M. Arena, M.D.
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Encephalitis as a complication of measles has been described as early as 11 days preceding the rash and as late as 42 days following the exanthem.[1] Its incidence is 0.1 to 0.2 per cent,[2] but only eighteen cases have been reported in which it occurred before or during the prodromal stage of measles, that is, before the occurrence of Koplik spots, the enanthem or exanthem. However, the signs and symptoms of encephalitis often appear early in the incubation period of infectious diseases and the incidence of pre-measles encephalitis probably is far greater than that recorded. Encephalitis preceding the actual swelling of the parotid gland in mumps occurs frequently and it has even been described in the absence of parotitis following exposure to mumps.[3] Encephalitis may follow smallpox vaccination, the onset varying between extremes of four and thirty days.[4] Well defined pathological changes and clinical manifestations are found in measles, rubella, variola vaccinia, varicella and mumps.

Case Report.—B. H. was a 3-year-old Negro boy admitted to Duke Hospital on April 14, 1944, with the complaint of vomiting and convulsions of nine days' duration. His past health had been excellent and the family history was irrelevant. The onset was on April 5, 1944, when he complained of not feeling well and began to vomit. For the next four days vomiting continued and he seemed irrational. The mother did not think that he had much fever at the time. On the fifth day he had a generalized convulsion and during the next four days he had about 30 convulsions.

On physical examination he was still twitching from his last convulsion. The temperature was 39° C. (102.2° F.). He was stuporous and kept his head turned to the right. The skin was dry and hot, and dehydration was fairly extreme. There was bilateral nystagmus, and conjunctivitis was marked. Ophthalmoscopic examination showed the disks to be blurred but no definite papilledema was noted. The mucosa of the mouth was hyperemic but no one mentioned the presence of Koplik spots. The tonsils were hypertrophied and inflamed. The lungs were filled with fine and coarse rales. Neurological examination showed definite nuchal rigidity and more weakness of the left arm and leg as compared to the right. The deep reflexes were hyperactive. The Babinski sign was positive on the left but negative on the right. The hemoglobin was 12.6 grams (80 per cent). The red blood count was 4,100,000, and the white count was 14,600 with a normal differential. The urine and serologic tests for syphilis were negative.

Immediately after admission a lumbar puncture was done. The fluid was clear and under pressure. There were 40 lymphocytes and the Pandy test was 2 plus. He was seen by a neurosurgeon who felt that the child had a brain abscess. He was given parenteral fluids to combat dehydration and sedatives were given to control the convulsions. The morning after admission the diagnosis was quite obvious. He had developed a maculopapular exanthem that involved the face, neck, and thorax. The rash continued to spread to involve the entire body within 48 hours.

Koplik spots were detected on the buccal mucosa but most of the lesions had coalesced and were indistinct. Immediately after the onset of the rash the child showed marked improvement. The temperature returned to normal, the convulsions ceased, and his sensorium was clear. He ate heartily and by the time he was discharged on April 25, he had recovered completely except for slight weakness of the left arm and leg. On further questioning of the mother it was found that a severe epidemic of measles existed in their county but she knew of no direct exposure that the child had had.

COMMENT

Nine days elapsed from the time of the initial symptoms of encephalitis before the appearance of exanthem of measles in our case. There was an interval of eleven days in the case reported by Clemens.[5] The time element involved in these as well as in the other reported 18 cases would indicate that encephalitic manifestations of the pre-measles variety may appear early during the incubation period. The early use of large doses of immune serum globulin (human) in these patients, if the correct diagnosis is suspected, should prove of considerable benefit. Not only should the measles be modified but it is quite possible that the encephalitic process may be arrested and further involvement of the central nervous system may be prevented. The appearance of the rash in our case was followed by immediate improvement in the encephalitic symptoms. The convulsions ceased and the child was responsive for the first time. Recovery was uneventful thereafter. This finding was also quite apparent in the case reported by Clemens.[5] The rather marked leukopenia associated with measles is not seen in pre-measles encephalitis.

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*Read in Section on Pediatrics, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.

*From the Department of Pediatrics, Duke University School of Medicine, and Duke Hospital.

This complication occurring early in the incubation period is associated with the usual polymorphonuclear leukocytosis noted during the invasion stage.

SUMMARY

(1) The nineteenth case of pre-measles encephalitis is reported. Recovery was rapid as soon as the exanthem appeared.

(2) The incidence of pre-measles encephalitis is probably much greater than the reported cases would indicate.

(3) The use of large doses of immune serum globulin (human) is advocated in these patients since the encephalitic symptoms often appear early in the incubation period.

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5. Clemens, H. H.: J. Ped., **22**:731, 1943.

DISCUSSION (*Abstract*)

Dr. Gilbert J. Levy, Memphis, Tenn.—I feel that there are many missed cases of pre-measles encephalitis. This discussor with a clinical experience of twenty-five years in practice and in a communicable disease hospital has failed to record a single instance of pre-measles encephalitis. Our records for 1934 do disclose two reported cases in Negro brothers, aged 15 and 17 years.

In reviewing this case report, one of the chief points of interest was the nine-day duration of encephalitic symptoms prior to the diagnostic morbilliform eruption. The mother of this three-year-old Negro boy must have had the patience of Job to sit by the bedside and witness thirty convulsive seizures before securing medical aid. A revision of "incubation period" is in order, for the teaching has been for a century that incubation means the period during which a disease is developing in the body and during which time no symptoms are exhibited by the patient.

One can speculate upon the etiology of this case. Was it a true toxic encephalitis with the toxin produced by the ultra microscopic organisms which caused the initial focal lesion being carried to the brain possibly through the blood stream? Lust and Schick advanced the opinion many years ago that the cause of post-measles encephalitis was a latent neurotropic virus which is stimulated to activity by the measles virus or by the lowered resistance of the patient. This case would represent the reverse of this theory.

The spinal fluid cell count of this patient was 40 lymphocytes. I would like to ask Dr. Arena if he has made any comparison of pre-measles encephalitis spinal fluid with post-measles encephalitis fluid. In our seven reported cases in 1934 of post-infectious measles encephalitis, the cell counts ranged from five in the lowest to 293 in the highest. The average number of cells was 89 lymphocytes predominated with an average of 85. The sugar and chlorides averaged 85 mg. per 100 c. c. of spinal fluid and the clorides averaged 663 mg. per 100 c. c. of spinal fluid.

Emphasis by Dr. Arena on the early recognition and its prevention if suspected by the use of large doses of measles immune serum globulin (human) is good. Deaths are not infrequent in post-infectious encephalitis. In 1934 at Memphis, two deaths occurred among seven cases, a mortality of 28.5 per cent. During the succeeding years

1938—3 cases: 1 death—33-1/3 per cent mortality.
1943—4 cases: 1 death—25 per cent mortality.
1945 to Nov.—2 cases: 1 death—50 per cent mortality.

Our total post-measles encephalitis reported cases from 1934 to 1945 were 26 cases with 5 deaths, a mortality of 19 per cent.

This mortality rate would certainly justify the early use of immune globulin (measles) or convalescent measles serum in suspected pre-measles encephalitis.

Dr. Edward W. Stevens, West Palm Beach, Fla.—It has often been observed that certain strains of microorganisms apparently have an affinity for tissues unfamiliar to the average organism of the same family and type. Likewise, it has also been observed that certain physicians seem to have an affinity for, and therefore observe and diagnose rare diseases which are missed by the average physician. Dr. Arena has been accused of having an affinity for unusual cases, upon a number of occasions even before this excellent presentation.

Speaking from the standpoint of a pediatrician practicing away from a medical center and with resultant limited library facilities, I am indebted to Dr. Arena and to others like him, for keeping us informed.

When first asked to discuss this paper, I contacted colleagues from West Palm Beach, Miami and vicinity, seeking to get additional information. The answer was universally the same, a shrug of the shoulder and a questioning elevation of the brow.

A few pertinent facts and two questions regarding Dr. Arena's paper will be considered in this discussion.

The incidence of pre-measles encephalitis is undoubtedly many times more frequent than is indicated by the number of cases reported. This is probably due, as intimated before, to the ignorance of the average pediatrician that such a diagnosis actually exists. To illustrate, in checking my own cases of measles over an 8-year period, the following two cases are noted.

Each of these two cases followed a known exposure to measles. The patients, both girls between the ages of two and three years, had a series of convulsions (one child had 12) terminating abruptly with the appearance of a typical measles rash. In each instance, photophobia, cough, and Koplik spots were noted three days before the appearance of the rash and in each case convulsions commenced four days prior to the rash. Both cases occurred during the fall of 1939, and

neither was given immune globulin at that time. Only one case was hospitalized for the purpose of lumbar puncture, and in this case the appearance of the rash and cessation of convulsions immediately upon admission, caused me to omit this procedure. Neither case was followed by sequelae and in each instance consultants agreed that we were dealing with a case of pre-erupted measles and the opinion was given that the appearance of the rash would herald the cessation of convulsions. The prognosis was considered good and the diagnosis of pre-measles encephalitis was not suspected by any of the attending physicians. Blood counts in each instance, showed a leukopenia without change in the Schilling index. Urines were negative. No pathological reflexes were observed and no stiffness of the neck seen. Vomiting was a major symptom in each case.

It is indeed unfortunate that spinal fluid examinations were not done as this latter procedure might have allowed us to add two additional cases to those already recorded.

The questions to Dr. Arena:

In contra-distinction to pre-measles encephalitis, post-measles encephalitis is a complication which gives rise to a stated mortality rate of from 30 to 50 per cent. Likewise sequelae for post-measles encephalitis are frequent, one writer stating that either motor or sensory disturbances remain in over half the cases which recover.

In view of the above observations, Dr. Arena, do you consider that cases of pre- and post-measles encephalitis may be due to different strains of the measles virus?

Second question: Have sequelae been reported in cases of pre-measles encephalitis? Would immune globulin be indicated in post-measles encephalitis?

Dr. J. A. Toomey, Cleveland, Ohio.—In the thousands of cases of measles I have had in over 25 years, I have never seen the condition described by the essayist. I am familiar with the fact that in the literature there are described such cases, but I have not seen them, although it is quite possible that I have missed them.

I have seen many individuals who have had convulsions at the onset of measles or just prior to the onset of measles, but we never had the temerity to dignify this condition by the term, "encephalitis."

The question that came to my mind was whether something else might have been the etiological factor of the condition related in these instances. I noticed that the Negro child described was markedly dehydrated. Why was he dehydrated? Did he have some condition that dehydrated him? Did he have alkalosis? That is sufficient in itself to bring about an encephalitic reaction.

Dr. Lee Bivings, Atlanta, Ga.—I wish to ask Dr. Arena a question as to the comparative value of gammaglobin fraction for measles instead of immune serum. The fraction that I mention is the one which has been prepared, I think, under the auspices of the Navy during the war and which is being contributed by the Red Cross at the present time.

Then I should like to add the experience I just recently had, not with measles encephalitis, and I must confess that I never suspected a case of encephalitis, in a case that I discharged from the hospital the day I left Atlanta.

This patient had an atypical pneumonia and he in the early period, although the diagnosis was made quite early by x-ray, went through the stage of convulsions and persistent vomiting, which I attributed at the time to the sulfa drug reaction. However, looking back on it, I am sorry I did not do a lumbar puncture. It probably would have been a condition similar to that which Dr. Arena has described.

Dr. Arena (closing).—We were at a loss for a diagnosis until the patient developed the typical exanthem. We suspected it then because it had been only a month since Clemen's article came out in the *Journal of Pediatrics*, reporting 17 cases. That is probably why we made the diagnosis.

The mother was not so negligent as you would presume from the case history since I failed to mention that the patient had been in two other hospitals before he arrived at ours.

The cell count in the spinal fluid has varied in the reported cases from no cells at all to 200 lymphocytes in others. Sequelae have occurred as frequently in the pre-measles encephalitis as in post-measles encephalitis.

The dehydration that Dr. Toomey mentioned was due to the severe vomiting which the patient had had for the nine days preceding admission to the hospital.

The immune globulin (human) referred to is the gamma fraction of pooled plasma fractionated by the method of Kohn and his co-workers.

EXPERIMENTS IN MEDICAL EDUCATION AND MEDICAL CARE IN A NEW MEDICAL SCHOOL*

By C. C. CARPENTER, M.D.†
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Although volumes have been written on the medical school curriculum, few important changes have been made in it during the last fifty years. It has been said that men rarely have new ideas after forty years of age. In most medical schools, the control of the curriculum is in the hands of

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the senior staff, who usually successfully resist all changes. When the Wake Forest Medical School was expanded to become the Bowman Gray School of Medicine of Wake Forest College, a group of young men was assembled and given complete freedom to experiment in medical education. This they have done for four years with gratifying results.

UNDERGRADUATE PROGRAM

None of the recognized fundamentals have been omitted from the curriculum of the Bowman Gray School of Medicine. Our objective has been for members of the faculty and house staff to team with the student in a correlated program for the study of medicine. The human subject, sick or well, comprises the central theme. Animate and inanimate laboratory materials are employed for illustration only where it is impractical to use the living human subject.

The traditional dissections in anatomy, for example, are carried out as exercises to demonstrate the structures involved in a clinical case, rather than to teach abstract facts. A clinic in anatomy presented by the orthopedic surgeon the first week the student is in medical school may show a fracture of the femur. The muscles which produce displacement of the fragments of bone will be discussed, and the way in which their origin and insertion determine their pull will be demonstrated. The clinic will be followed in the anatomy laboratory by dissection of the thigh, the students tracing out the structures mentioned in the clinic in the usual fashion. In the same manner, a clinic showing a patient upon whom an appendectomy has been performed will serve as an introduction to a dissection period in which the layers of the abdominal wall are studied.

Appropriate cases illustrating the importance of the fundamental sciences in the care of the sick patient are presented throughout the courses of anatomy, biochemistry, physiology, pathology, bacteriology, pharmacology and laboratory diagnosis. These clinics are conducted by the clinician as a member of the staff of the fundamental science department concerned. *Table* 1* shows how the preclinical subjects are correlated with clinical subjects.

In the junior and senior years the process is reversed (*Table 2*).

Members of the staff whose major interest is in a fundamental science make ward rounds with

*Tables prepared by Dr. George T. Harrell, Jr., Director of the Department of Medicine, Bowman Gray School of Medicine of Wake Forest College.

CORRELATION OF MEDICAL CURRICULUM

Freshmen and Sophomores

From	To	Type of Instruction
Surgery	Anatomy	
Medicine and Surgery	Biochemistry	Introductory clinics
Medicine	Physiology	

CORRELATION OF MEDICAL CURRICULUM

Sophomores

From	To	Type of Instruction
Medicine	Pathology	Clinics
	Pharmacology	Clinics, assigned patients
	Clinical Microscopy	Clinics
Medicine and Pediatrics	Preventive Medicine	Clinics
	Bacteriology	Clinics
Surgery	Pathology	Experimental—animal

Table 1

CORRELATION OF MEDICAL CURRICULUM

Juniors

From	To	Type of Instruction
Bacteriology	All	Cultures, agglutinations
Anatomy	Medicine and Obstetrics	Lectures
Laboratory	Medicine	Ward rounds
Pharmacology	Medicine	Ward rounds—therapeutics
Pathology	Obstetrics and Surgery	Gross and microscopic

Seniors

From	To	Type of Instruction
Pathology	Medicine	Autopsy gross
Physiology	Medicine	Clinics
Biochemistry	Medicine	Clinics
All	Medicine and Pediatrics	Papers

Table 2

students, give lectures, and hold conferences with clinical clerks (third and fourth year students) on the anatomy, biochemistry, physiology, pathology, or bacteriology involved in the case which the student is working up. The student at this time brings his knowledge of the fundamental sciences to the bedside doing the laboratory work on his own patients. He learns through this experience the "practical" aspects of basic scientific knowledge in the diagnosis and treatment of sick people. The biochemist, physiologist, pharmacologist, pathologist, and bacteriologist are his colleagues and consultants at all times to help him through deep water or over rough places.

GRADUATE PROGRAM

Training in the fundamental sciences as required for certification by the various specialty boards is provided for the members of our house staff. If such training is detached from the patient, however, it fails to serve the purpose of the requirement. *Table 3* shows the method of correlating clinical subjects with fundamental sciences for house officers.

In our program two assistant residents in surgery assist in teaching anatomy. One or more assistant residents in medicine and pediatrics works directly with the clinical clerks in bacteriology, biochemistry, and laboratory diagnosis. The assistant residents on surgery and gynecology do routine surgical pathology. Each afternoon a half-hour demonstration of the surgical pathology for the day is attended by the residents on surgery, gynecology and radiology, as well as by the house staff on pathology.

RESPONSIBILITIES OF THE FACULTY

Can such extensive correlation of undergraduate and graduate medical education actually be effective? The answer to this question is almost wholly dependent upon the faculty. Every member of the faculty must wholeheartedly favor the program. A favorable faculty attitude cannot be "regimented." Each faculty member must have personal convictions that it is a sound and practical plan of medical education. He must unselfishly forego departmental autonomy and think in terms of "one world;" otherwise private interests on the part of both faculty and students will lead to a gradual drift into the usual compartment-like curriculum.

A faculty member cannot maintain interest in a program for which he is unprepared. For effective correlation almost all members of the faculty must be trained in some field of clinical medicine and have special knowledge of one of the fundamental sciences. In other words, they must be interested in practice and well trained in a basic medical science. For illustration, in our school the professor of surgery is trained in physiology; the professor of physiology is trained in internal medicine; and the director of the department of medicine is a trained pathologist. Each spends the greater portion of his time in his major field and a lesser portion of time in a correlated field. The question immediately arises whether a person who does not hold the degree of doctor of medicine could serve effectively on such a faculty. Certainly. The degree held is unimportant if one has the proper philosophy and training for the job. Two members of our faculty who hold the degree of doctor of philosophy rather than doctor of medicine are among our best exponents of the correlative method of teaching.

CORRELATION OF MEDICAL CURRICULUM

Postgraduate—House Officer

From	To	Rank	Duties
Medicine	Bacteriology	Asst. Res.	Supervise students; simple research
Surgery	Pathology	Asst. Res.	Autopsies, surgicals, teaching
Pediatrics	Preventive Medicine	All	County immunization clinics
Surgery	Anatomy	Asst. Res.	Teaching

Table 3

CARE OF PATIENTS

A well correlated medical curriculum requires a hospital that is in harmony with the teaching program. The North Carolina Baptist Hospital and the Bowman Gray School of Medicine are physically one building. The staff of the hospital is the faculty of the medical school. The business management of the hospital is under an administrator trained in a teaching hospital. The dean of the medical school is medical director of the hospital, and has the same authority in professional matters in the hospital that he has in other departments of the school.

All patients are cared for under the teaching program regardless of their financial classification. So far no patient has objected to being a "teaching case." Private patients appreciate the more careful study which they receive under the critical scientific teaching program. The clinical clerk, intern, resident, basic science specialist, and clinician form a unified team that provides the best possible medical care, with total disregard of the financial status of the patient. All out-patients are seen by appointment, and only the number that may be seen without overloading the staff and facilities are given appointments for a clinic period. From this group cases are selected for hospitalization. Since the demands for hospitalization far exceed the capacity of the hospital, two criteria are employed in selecting patients for admission: (1) Will this case help to provide a wide variety of cases for teaching? (2) Does this patient need care that cannot be provided in the ordinary non-teaching hospital?

The clinic and hospital serve non-teaching hospitals and the medical profession in the north piedmont and northwestern area of North Carolina for diagnosis of difficult cases, consultation, and treatment in cases requiring a high degree of specialized skill or facilities not ordinarily available in smaller hospitals.

SERVICES TO THE PROFESSION

The department of pathology provides diagnostic service for 28 hospitals that do not have a pathologist. The radiologist makes regular visits to a group of hospitals to read difficult films. The orthopedic, pediatric, and obstetric departments hold regular clinics throughout the area served by the hospital.

A clinic and clinical pathological conference held each Monday night are attended by the faculty, students, and visiting doctors from the surrounding area. The program for the meeting is planned to correlate basic sciences and clinical medicine in keeping with the over-all policy of the school. During the first half-hour two cases that illustrate a diagnostic problem or a point in therapy are presented. During the next hour a clinical pathological conference is held, with discussions by a clinician, a pathologist, and a physiologist, in addition to a fifteen minute general discussion.

RESULTS

Three classes have been graduated, totaling 115 doctors. These graduates have served internships in 48 different hospitals. Reports have been received from 28 hospitals on 58 interns. None of the hospitals reported defects in training. Twenty-one hospitals, or 75 per cent of the hospitals reporting, commented favorably on the training and ability of the intern.

Ninety interns and residents have been given from nine months to four years of training. Sufficient time has not yet elapsed to evaluate their performance as physicians.

Requests for extension of diagnostic service, medical care, and consultation assistance in the area served suggest that the program is a welcomed community asset.

CONCLUSION

A new school without the obstructions of tradition, the Bowman Gray School of Medicine of Wake Forest College is conducting a research program in medical education. This preliminary report is based on four years' experience with the program. While recognizing that there are potential dangers which must be avoided in modernizing the curriculum, we feel that improvements in the traditional curriculum are possible and, indeed, necessary. Our aim is to lose none of the fundamentals in setting up a new approach to a program of medical education and medical care.

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EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
Fortieth Annual Meeting
Miami, Florida, November 4-7, 1946

MIAMI IS THE PLACE

Last summer the story was being repeated of the Negro chauffeur who said, "It look lak the duration is gonna last longer than the war." The duration is still going full tilt, and a city to accommodate a large convention is difficult to discover. Hotel rooms are at as much of a premium as veterans' bungalows. However, the Executive Committee of the Southern Medical Association met in St. Louis in May and succeeded in choosing a delightful resort city where all the hotel space desired will be available for the fall meeting.

Miami, Florida, the first week in November (November 4 to 7) has been selected. Members of the Association will have the benefit of summer rates, and there will be space for the women and children. Miami is beautiful at that season. If summer hotels are as crowded as they bid fair to be in 1946, Southern Medical members may well plan to postpone their summer holiday to November and spend it in the playground of America, where fishing, sailing, hunting, boating, all outdoor sports and health-giving sunshine abound. Page 523 of the JOURNAL contains a description of some of the attractions of Miami for those who may have forgotten them during the war. A wonderful vacation with all the scientific courses that a physician can absorb awaits members of the Association in Miami in November.

MARIHUANA ADDICTION

The great contribution of World War II to medicine may be along psychiatric lines. Never before have so many men been gathered under one control, and never before have their mental disturbances been so thoroughly investigated. Progress in the handling and prevention of major psychoses should evolve from these military studies.

A recent analysis of the qualities of sixty marihuana addicts[1] is sufficiently interesting for comment. The report comes from Fort McClellan, Alabama, which at the time had a ratio of seven white infantry training regiments to one Negro. In the group of marihuana addicts, however, Negro soldiers greatly predominated. Of the sixty addicts, fifty-five were Negro, and five white. The men were all young inductees, of an average age of twenty-two, who had been using the drug for an average of six years before induction into service. The average age of beginning addiction, thus, was sixteen years, and in many of the men it had begun at a younger period. Six, or one-tenth, began using it before adolescence. In more than seventy per cent, its use began at grade or high school ages.

Marihuana is classed as a habit-forming sedative. It is the American name for cannabis, or Indian hemp, a material used as an intoxicant in Africa and Asia since time immemorial. Hashish, bhang, ganja are other names. It is now habitually indulged in by some one or two hundred millions of mankind, according to Cushny.[2] Its use is particularly popular among Mohammedans, whose religion forbids alcohol. It is inhaled in smoke, either mixed with tobacco or without it, it is used as an intoxicating drink, or taken mixed with sweets as a confection. Its spread in this country belongs largely to the last decade. Especially since 1935 cigarettes containing Indian hemp, or mari-

1. Charen, Sol; and Perelman, Luis: Personality Studies of Marihuana Addicts. Amer. J. Psychiat., **102**:674 (Mar.) 1946.
2. Edmunds, C. W.; and Gunn, J. A.: Arthur R. Cushny's Pharmacology and Therapeutics. Twelfth Edition, Philadelphia: Lea and Febiger, 1940.

huana, have been increasingly sold in the United States and to a less extent in Canada and England. The drug is reportedly increasing in Mexico and Brazil.[3] The cigarettes and candy are often sold in the United States in the neighborhood of public schools to children and adolescents, and their marketing is associated with increase in the incidence of crime. Walton[1] is quoted as saying that the use is widespread among school children in New Orleans.

Charel and Perelman[1] have attempted to analyze the type of mentality which becomes addicted to marihuana. They find many characteristics in common among the habituals. The preponderance of Negroes, they say, is due to the peculiar need marihuana serves for them. The Negro psychopath or neurotic faces not only inner anxiety resulting from an insecure childhood, commonly poverty and a broken home, but also suffers from a feeling of resentment towards the submission required by whites. Addiction enables him to feel a sense of mastery denied him by his color. The white psychopath under similar environmental frustration finds alcohol more acceptable.

Most of the sixty addicts studied were sent in for psychopathic behavior rather than drug addiction: such offenses as insubordination, going repeatedly AWOL, being poor soldiers. Sullenness, and resentment of authority were typical of most. Only ten had never run afoul of the law in civil life. Drunkenness, fighting, petty thievery, and sexual immorality or perversion were common in their histories. They employed a common cheap slang, by which addicts recognized one another. They liked to get together at "teas" for the use of the drug, at which various filthy performances were common. Their intelligence was normal, and they were well satisfied with themselves. They had no desire to improve themselves by ceasing the use of the drug. Desire to be cured is lacking, say the investigators,[1] and institutionalization over long periods, which has been recommended, will not help them. From an early age there has been a swing to delinquent behavior. Marihuana restores the confidence which a criminal personality needs. The Negro marihuana addict, they say, makes a very poor soldier.

This would seem to be a stimulant enjoyed by the hopeless. The very early age of onset of addiction to a drug which depresses or damages the central nervous system in its developmental period must leave permanent injury.

Increasing use of the drug in this country is a cause for alarm. The basic problem of control is prevention of distribution by such laws as are deemed wise. Marihuana as an industry should not be permitted to entrench itself further, lest the Americas develop as many addicts as now exist in poverty-stricken areas of Asia. Protection of children from marihuana depends not only upon law enforcement officers. Its control is that of delinquency in general.

3. McGuigan, Hugh A.: Applied Pharmacology. St. Louis: C. V. Mosby Co., 1940.

OVARY AND ADRENAL

The endocrine glands furnish an elaborate system for adapting the body to a changing environment and for aiding in the proper selection, rejection, and assimilation of the diverse nutrients ingested. One pictures them under normal conditions as enlarging in the face of a limited supply of a needed material (for example, the thyroid in the presence of a deficiency of iodine) and diminishing in size and activity as the supply becomes abundant. If a deficiency is prolonged over too long a period the gland may either become exhausted or develop an abnormally secreting portion, a tumor.

One gland is rarely or never in complete control of a single metabolite, but all interact, in some fashion. The anterior pituitary secretes a thyrotropic, an adrenotropic, and a gonadotropic hormone, among others, and it is these stimulating specifics which cause the physiologic hypertrophies, and are themselves limited by substances produced in the reacting glands. Whether all endocrine gland stimulation is relayed through the anterior pituitary is a matter for investigation. The anterior pituitary has been called the motor of the body. There are compensatory reactions between other glands, apparently. Changes in the adrenals occur after extirpation of the gonads.

Gonadectomy is followed by changes in the size

of the adrenal gland. Ovariectomy apparently causes a decrease and castration an increase in the adrenal. Douglas Smith[1] of Ohio State University has investigated the functional changes of the adrenals after ovariectomy, and his report throws light upon various physiological facts. Sodium metabolism and the production of glycogen in the body, according to this author, are controlled by the adrenals, and altered after ovariectomy. The blood sodium level rises, and there is increased glycogen formation in the body. Following ovariectomy the body weight of the animal increases. This is a common observation among domestic animals, and weight gain of women following ovariectomy or the menopause is repeatedly observed. The plasma sodium level, he reports, was higher than normal in rats two months after ovariectomy. Sodium metabolism and glycogen deposition he believes to be correlated with histologic changes observed in the adrenals. It was believed that the increased plasma sodium levels and increased glyconeogenesis following ovariectomy were due to increased secretion of sodium-retaining and carbohydrate active factors from the adrenal cortex, and it was suggested that these in turn were due to an increased output of adrenotropic factor from the anterior pituitary. The results in rats, of increased sodium retention, which would permit increased water retention, and increased rate of production of glycogen, if they occur also in humans, would explain the greater tendency to weight gain after the menopause, and confirm the lay belief that the weight gain is not solely a matter of caloric intake.

The changes in adrenal function which follow extirpation of the ovaries, Smith believes, are effected through the pituitary.

1. Smith, Douglas E.: Adrenal Function Following Ovariectomy in the Rat. Amer. J. Physiol., **146**:133 (April) 1946.

TWENTY-FIVE YEARS AGO

From Journals of 1921

Tobacco Effects.[2]—Newspaper comment insinuates persistently that my Lady Nicotine is to follow her paramour, John Barleycorn, to realms outside the blue laws. The reaction to these intimations, however, indicates that she will have more mourners and fewer detractors if she should ever be started along the same route of the more or less lamented John. * * * there are not many reliable studies on the influence of tobacco on the human organism * * * A number of men doing the same sort of work in a bottle-making factory were observed * * * the best work was done by the heavy smokers and those who did not smoke at all, while the men who chew are far below the average.

Nurse Shortage in Vienna.[3]—As a consequence of the social upheaval, occupations requiring a more than ordinary amount of devotion are not much sought after by the lower classes of the population. If it is hardly possible at present for a middle class household to find a servant, this fact, not in itself important from the standpoint of the State, assumes a different aspect when it is considered that numerous women unused to household work now have to do it, and thereby suffer severely in health * * * Moreover, the children cannot be looked after so thoroughly if the middle class mother has to leave them to do shopping, etc. The general health is thus materially affected. Still more important is the fact that the very onerous vocation of nursing is now becoming discredited. In the General Hospital alone, where good pay and good board are available, more than seventy sisters are wanted.

Gardens in Vienna.[4]—Food scarcity during the war resulted in cultivation of vegetables on every available plot of waste ground, even within the city * * * This national necessity has now been so impressed upon the town dwellers that the precincts and outskirts of Vienna at present form a zone of highly cultivated small gardens and allotments * * * Only by these means can the town dwellers rid themselves of dependence upon the agricultural profiteer.

Cause of Rickets.[5]—The Accessory Food Factors Committee of the Medical Research Council of Great Britain has sponsored the idea that rickets is a deficiency disease due to diets which are unbalanced in that they contain too little of those substances rich in an antirachitic factor, and too much of those deficient in this respect. This conclusion was based almost entirely upon the investigations of Mellanby, who believes that, in many respects, the antirachitic factor has a distribution similar to that of what has been described in this country as fat-soluble A; and the suggestion lies near that the antirachitic property of foods is identical with the fat soluble vitamin * * * The physiologists of the University of Glasgow have insisted * * * that Mellanby's conclusions are unwarranted * * * On the diets which Sherman and Pappenheimer of Columbia University used, rickets uniformly appeared in the absence of phosphates.

2. Current Comment. Smoking Versus Chewing. J.A.M.A., **76**:1579 (June 4) 1921.

3. Vienna Correspondent. Scarcity of Nurses in Hospitals. Lancet, p. 1267 (June 11) 1921.

4. Ibid. The Allotment Movement in Vienna.

5. Editorial. Further Facts About Rickets. J.A.M.A., **76**:1844 (June 25) 1921.

OFFICERS

The following is a complete roster of the officers of the Southern Medical Association for 1945-1946, and of associations meeting conjointly with the Southern Medical Association:

President—Dr. M. Y. Dabney, Birmingham, Ala.

President-Elect—Dr. E. L. Henderson, Louisville, Ky.

First Vice-President—Dr. Lucien A. LeDoux, New Orleans, La.

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Secretary-Manager (Secretary, Treasurer and General Manager)—Mr. C. P. Loranz, Birmingham, Ala.

Editor of Journal—Dr. M. Y. Dabney, Birmingham, Ala.

Associate Editor of Journal—Mrs. Eugenia B. Dabney, Birmingham, Ala.

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Section on Radiology—Dr. Karl F. Kesmodel, Chairman, Birmingham, Ala.; Dr. Paul F. Titterington, Vice-Chairman, St. Louis, Mo.; Dr. J. Marsh Frere, Secretary, Chattanooga, Tenn.

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Section on Obstetrics—Dr. Waverly R. Payne, Chairman, Newport News, Va.; Dr. Frank R. Lock, Vice-Chairman, Winston-Salem, N. C.; Dr. E. Lee Dorsett, Secretary, St. Louis, Mo.

Section on Urology—Dr. Ray M. Bobbitt, Chairman, Huntington, W. Va.; Dr. William T. Briggs, Vice-Chairman, Lexington, Ky.; Dr. Jarratt P. Robertson, Secretary, Birmingham, Ala.

Section on Proctology—Dr. Victor K. Allen, Chairman, Tulsa, Okla.; Dr. William J. Martin, Vice-Chairman, Louisville, Ky.; Dr. Tom E. Smith, Secretary, Dallas, Tex.

Section on Ophthalmology and Otolaryngology—Dr. Kate Savage Zerfoss, Chairman, Nashville, Tenn.; Dr. Calhoun McDougal, Chairman-Elect, Atlanta, Ga.; Dr. V. R. Hurst, Vice-Chairman, Longview, Tex.; Dr. Alston Callahan, Secretary, Birmingham, Ala.

Section on Anesthesiology—Dr. John Adriani, Chairman, New Orleans, La.; Dr. Merrill C. Beck, Vice-Chairman, New Orleans, La.; Dr. Fred E. Woodson, Secretary, Tulsa, Okla.

Section on Medical Education and Hospital Training—Dr. Douglas H. Sprunt, Chairman, Memphis, Tenn.; Dr. Donald Slaughter, Vice-Chairman, Dallas, Tex.; Dr. J. P. Gray, Secretary, Richmond, Va.

Section on Public Health—Dr. Ben F. Wyman, Chairman, Columbia, S. C.; Dr. George A. Dame, Vice-Chairman, Jacksonville, Fla.; Dr. Robert E. Fox, Secretary, Raleigh, N. C.

American Public Health Association, Southern Branch (meeting conjointly with Southern Medical Association)—Dr. W. K. Sharp Jr., President, Richmond, Va.; Dr. George A. Denison, First Vice-President, Birmingham, Ala.; Mr. J. M. Jarrett, Second Vice-President, Raleigh, N. C.; Mrs. Abbie Weaver, R. N., Third Vice-President, Atlanta, Ga.; Dr. John W. Williams Jr., Secretary-Treasurer, Jefferson City, Mo.

National Malaria Society (meeting conjointly with Southern Medical Association)—Mr. J. A. LePrince, Honorary President, Memphis, Tenn.; Dr. Mark F. Boyd, President, Tallahassee, Fla.; Mr. Mark D. Hollis, President-Elect, Atlanta, Ga.; Mr. J. A. Mulrennan, Vice-President, Jacksonville, Fla.; Dr. Martin D. Young, Secretary-Treasurer, Columbia, S. C.

American Society of Tropical Medicine (meeting conjointly with Southern Medical Association)—Dr. James S. Simmons, President, Washington, D. C.; Dr. Edward I. Salisbury, President-Elect, New York, N. Y.; Dr. Joseph S. D'Antoni, Vice-President, New Orleans, La.; Dr. Norman H. Topping, Secretary-Treasurer, Bethesda, Md.; Dr. Charles F. Craig, Editor, San Antonio, Tex. *American Academy of Tropical Medicine* (meeting conjointly with American Society of Tropical Medicine)—Dr. James S. Simmons, President, Washington, D. C.; Dr. George K. Strode, Vice-Chairman, New York, N. Y.; Dr. Ernest Carroll Faust, Secretary and Assistant Treasurer, New Orleans, La.; Dr. Thomas T. Mackie, Treasurer, Washington, D. C.

American College of Chest Physicians, Southern Chapter (meeting conjointly with Southern Medical Association)—Dr. Carl C. Aven, President, Atlanta, Ga.; Dr. Paul A. Turner, First Vice-President, Louisville, Ky.; Dr. Herbert L. Mantz, Second Vice-President, Kansas City, Mo.; Dr. Benjamin L. Brock, Secretary-Treasurer, Oteen, N. C.

American Academy of Pediatrics, Region 2 (meeting conjointly with Southern Medical Association)—Dr. James W. Bruce, Chairman, Louisville, Ky.

Women Physicians of the Southern Medical Association—Dr. Ruth G. Aleman, Chairman, New Orleans, La.; Dr. Estelle A. Magiera, Vice-Chairman, Jackson, Miss.

Woman's Auxiliary to Southern Medical Association—Mrs. W. W. Potter, President, Concord, Tenn.; Mrs. W. R. Buffington, President-Elect, New Orleans, La.; Mrs. W. W. Crawford, First Vice-President, Hattiesburg, Miss.; Mrs. R. C. Haynes, Second Vice-President, Marshall, Mo.; Mrs. W. A. Selman, Treasurer, Atlanta, Ga.; Mrs. Philip E. Blackerby, Recording Secretary, Louisville, Ky.; Mrs. H. E. Christenberry Sr., Corresponding Secretary, Knoxville, Tenn.; Mrs. John Pierpont Helmick, Parliamentarian, Fairmont, W. Va.; Mrs. William Hibbitts, Historian, Texarkana, Tex.

Skyline of Miami with a Fishing Boat in Biscayne Bay heading for the Sea and Deep Fishing.

Miami—Where We Meet

RECREATION*

Sports are always top interest in Miami! It is one of the most sports-minded cities in the country.

When the temperature stays around 73.2, which is where it should be according to U. S. Weather Bureau records, next November, the date scheduled for the Southern Medical Association to meet in Miami, the call is to the great outdoors. Fall in the rest of the nation, it is at this time of year Miami shrubs and flowers are in bud and there is just sufficient crispness in the air to make a game of golf, a day's fishing, or a horseback ride the most inviting thing in the world.

There is fishing, prime among Miami sports, and hardly surprising at that when it is remembered that some of the finest fishing grounds in the world surround the Magic City. Visitors come to Miami from all over the world, and sooner or later most of them fish. Fishing is one of the great levellers of society in Miami. It is a fair example of the American way of life. The man at the side of the causeway with a pole and a cartonful of bait has just as good a chance of catching a prize-winning fish in one of the Metropolitan Miami Fishing Tournaments as the chap who charters a boat, takes his expensive equipment and a packed lunch out into the waters around the Keys. The same snapper, grouper or jack may be in either spot. But reef or bottom fishing is not the only sport in these waters where Nature has been just as bountiful with game as she has been with the climate. Three miles out in the Gulf Stream are the fighters of the deep, bonita, tarpon, tuna and the marlins. The green waters inside the stream house vicious barracuda. There is bone-fishing too, which attracts skilled anglers from far places as well as the man next door who likes to fight the lightning-like wiles of these fish, which are not very large, but whose strike has a mule's kick behind it.

For those who prefer the contemplative life there is also freshwater fishing, with a small license fee attached, on the bank of a stream or lake. But whatever his fishing desires, the visitor will find their fulfilment in Miami. At least one fishing trip is usually arranged by convention delegates.

The ardent boatsman, whether he be a sailing or speedboat enthusiast, will also find both boats and locations for his favorite sport, added to which, there are several regattas a year in which he may participate on the waters of Biscayne Bay.

Not everyone enjoys sports either on or by the water, however, even in Miami. There is the golfer and for him are ten fine courses in the area, mostly of championship caliber. With four on Miami Beach and

Miami Municipal Auditorium. Here will be Registration, Scientific, Hobby and Technical Exhibits and Some Sections for Miami Meeting in November.

*Prepared for the SOUTHERN MEDICAL JOURNAL by the News Bureau of the City of Miami, Mr. Benton E. Jacobs, Manager.

six on the mainland, although one of these is still in U. S. Army hands for the use of convalescent veterans, every golfer should be able to fight the good fight with par. Moreover, since the Weather Bureau statistics show that the sun shines 359 days a year in Miami, there is rarely a day when a round of golf is not both possible and enjoyable.

From the municipally-owned Miami Springs Country Club, the Miami Country Club, the course at Miami Shores and two courses in Coral Gables, also Normandy Isle and Bayshore courses on the Beach, all of which are available for play on payment of green fees, to the exclusive Indian Creek and La Gorce courses which require introduction by a member, the courses are all in fine condition.

The tennis player is equally well looked after. There are actually more than 132 courts in the Miami area, some of them at hotels or schools, 52 in parks and nine others privately owned. Most of the public courts are free, but eight of them, in Henderson Park, are lighted for night play and there is a nominal charge for their use. Here again tennis is an every-day-in-the-year sport.

For the man who prefers to see the country from the back of a horse there are five riding academies where saddle horses may be hired to explore the leafy bridle paths surrounding the city.

It is the man who likes his targets alive and kicking, however, who will hanker after a fall stay in Miami, within easy reach of the Everglades when the hunting season opens for quail, turkey, squirrel, dove and duck. He will get a chance to shoot his bag of game and also to see one of the last jungle strongholds of America and the home of the Seminole Indians.

There is the spectator sportsman too. He prefers a grandstand from which to take his sport more gently. First, so far as the visiting medical association delegates are concerned, comes football. The doctors will hit Miami in the middle of the season when the Roddey Burdine Stadium, nationally known as the Orange Bowl Stadium, really comes into its own. This bowl, already seating 38,000, has been found totally inadequate for present needs and plans are already formulated to have the structure double-decked to enable at least 60,000 people to enjoy the games. During the year the great event is, of course, the New Year's Day Classic when people from all over the country come to see the two University teams chosen to play against each other, but each Friday night throughout the season there are University games which play to packed houses, while there is a high school game here—probably the only one in the country—that between Miami Senior High and Edison Senior High, which regularly draws a crowd of more than 30,000 people. There will be at least one high school game during the time scheduled for the Southern Medical Association Convention, and a University game takes place on the night after the meeting winds up . . . nice thought for a post-convention "treat." Also there will be a professional football game between Miami and Chicago of the All American Conference League for those who stay over until November 11.

In the world of recreation Miami ranks sixth in the nation. That, of course, is without counting in the recreational qualities of swimming and sunbathing, which can hardly be tabulated so universal are they among residents and visitors alike. Recreation, however, in the way of park sports, is a going concern in Miami.

There are, for instance, 50 shuffleboard courts in the city, 26 at Lummus Park within the shadow of the Courthouse, 18 at Little River at the city limits, and six, where participation in this sport is free, at Moore Park. As is customary with shuffleboard, players pay a small fee for memberships or play with guest privileges from other parts of the country. Under the same entrance fee conditions is Bowling-on-the-Green also played in Lummus Park.

Other sports found in the city parks are roque, badminton, horseshoe-pitching, chess, checkers, handcrafts and all children's sports.

Book Reviews

Military Medical Manuals — A Manual of Tropical Medicine. Prepared under the Auspices of the Division of Medical Sciences of the National Research Council. 727 pages with 284 illustrations. Philadelphia and London: W. B. Saunders Company, 1945. Price $6.00.

This book is another one in the series prepared under the auspices of the division of medical sciences of the National Research Council. It presents a wealth of up-to-date information which should make it useful not only for medical officers of the armed forces but also in medical schools and laboratories, for public health workers, epidemiologists and parasitologists.

Diseases formerly classified as "tropical" are becoming more important to the temperate zones. The war has caused the movement of large masses of men into tropical zones; with the return of millions of these men tropical diseases will be encountered in the United States with greater and greater frequency. On the other hand, many communicable diseases are cosmopolitan rather than tropical diseases.

The book contains sections on virus diseases, rickettsial diseases, spirochetal diseases, bacterial diseases, mycotic diseases, protozoal diseases, helminthic diseases, nutritional diseases, and arthropods. There is also a splendid description of pertinent laboratory procedures. The individual diseases are discussed under the headings of synonyms, definition, distribution, etiology, epidemiology, pathology, clinical characteristics, diagnosis, treatment and prophylaxis. Every chapter is replete with data imparting a wealth of theoretical and factual knowledge. There is a large number of illustrations, including diagrams pictoralizing the epidemiology of tropical diseases. The book is beautifully printed and sturdily bound in cloth. The index is unusually complete. The manual is an excellent and authoritative book on a most timely subject.

Southern Medical News

SOUTHERN MEDICAL ASSOCIATION EXECUTIVE COMMITTEE MEETING

The Executive Committee of the Council of the Southern Medical Association met at The Coronado Hotel, St. Louis, Missouri, Monday, May 13, 1946 at 10:00 a. m. Present: Dr. Neil S. Moore, Chairman, St. Louis, Missouri; Dr. J. B. Lukins, Louisville, Kentucky; Dr. J. P. Culpepper Jr., Hattiesburg, Mississippi; and Dr. E. L. Henderson, President-Elect, Louisville, Kentucky. Sitting with the Committee by invitation of the Chairman: Dr. W. Raymond McKenzie, Chairman of the Council, Baltimore, Maryland; Dr. Walter C. Jones, immediate Past Chairman of the Council, Miami, Florida; Dr. Irvin Abell, Past President and Chairman of the Board of Trustees, Louisville, Kentucky; Dr. M. Pinson Neal, Past President and Member of the Board of Trustees, Columbia, Missouri; Dr. E. Vernon Mastin, Past President and Member of the Board of Trustees, St. Louis, Missouri; Dr. Curtice Rosser, immediate Past Chairman of the Executive Committee, Dallas, Texas; Mr. C. P. Loranz, Secretary and General Manager, Birmingham, Alabama; and Mr. Chase Delony, Assistant to Mr. Loranz, Birmingham, Alabama. Member of Committee not present: Dr. M. Y. Dabney, President, Birmingham, Alabama. Invited to sit with the Committee but not present: Dr. Lucien A. LeDoux, First Vice-President, New Orleans, Louisiana; and Dr. Oscar B. Hunter, next immediate Past Chairman of the Executive Committee, Washington, District of Columbia.

At its meeting last November the Council of the Southern Medical Association instructed its Executive Commitee to (1) decide where the Association meeting should be held this year and (2) to set up the program plan for that meeting.

After careful consideration the Executive Committee accepted the invitation of the Florida Medical Association to meet in Florida and of the Dade County Medical Society to meet in Miami. So the meeting this year will be held in Miami, Florida, the first week of November (November 4-7).

The Committee after a general and full discussion was unanimous in its decision that the amount of scientific program for this year should be the same as for the past two annual meetings—one full session for each of the twenty-one scientific sections. Monday afternoon and Tuesday forenoon will be designated "Miami Day" with two sessions, one general medical and one general surgical, running concurrently for those two half days, this "Miami Day" program to be by members of the Dade County Medical Society and to supplement the section programs. The section programs will start Tuesday afternoon. There will be one General Public Session, Tuesday evening; and one official social activity, a President's Reception and Ball, Wednesday evening. There will be a golf tournament this year.

The Committee approved the suggestion that there be a "Southern Medical Association Night" of the Dade County Medical Society in Miami, after consultation with and approval of the officers of the Dade County Medical Society, the program to be by officers of the Southern Medical Association and the Association to be host to a social hour, a so-called smoker, following the program.

The Committee approved a suggestion that Cuba be featured in the promotion of the Miami meeting, this as another reason for attending the meeting in Miami. The Secretary-Manager was authorized to arrange an official trip to Cuba if he deemed it wise and proper to do so.

It was the judgment of the Executive Committee that the dues of the Association should be advanced from $4.00 to $5.00 and will so recommend to the Council.

The Southern Medical Association complimented those in attendance upon the Executive Committee meeting and their wives with a luncheon at The Coronado Hotel and then that evening with a dinner at The Coronado Hotel to which were invited the officers of the Association in St. Louis, Past Chairmen of Sections in St. Louis, officers of the St. Louis Medical Society, officers of the St. Louis County Medical Society, officers of the Missouri State Medical Association in St. Louis, Deans and Assistant Deans of Medical Schools in St. Louis, and their wives; and the Presidents and Presidents-Elect of the Woman's Auxiliaries to the St. Louis Medical Society and the St. Louis County Medical Society and their husbands.

ALABAMA

Dr. Mansell B. Holmes, formerly Chief Medical Officer of the Veterans Hospital, Waco, Texas, has been named Manager, Veterans Hospital, Tuscaloosa, succeeding Dr. George L. Johnson, who will be Manager of the new Veterans Hospital, Thomasville, Georgia.

Dr. William Crane Cantrell, Hamilton, and Lieut. Doris Melvin, Nurse Corps, USN, Birmingham, were married recently.

Dr. Robert Torrance Cale and Miss Ruth Varnon, both of Birmingham, were married recently.

Dr. Vincent J. Schilleci, Bessemer, and Miss Frances Amanti, New London, Connecticut, were married recently.

Deaths

Dr. Means Blewett, Citronelle, aged 77, died recently of cardiovascular disease and angina pectoris.

Dr. Henry Young Harper, Oakhill, aged 37, died recently.

Dr. Luther Leonidas Hill, Montgomery, aged 84, died April 4.

Dr. Alexander Hood, Birmingham, aged 68, died recently of coronary occlusion.

Dr. John Carroll Johnson, Hamilton, aged 84, died recently of chronic interstitial nephritis.

Dr. Charles O. King, Birmingham, aged 58, died May 6.

Dr. Clarence Long, Hurtsboro, aged 70, died recently of heart disease.

Dr. Thomas Roy McLellan, Aliceville, aged 69, died recently of meningitis.

Dr. Johnnie Andrew Norris, Jr., Birmingham, aged 44, died April 27.

Dr. William David Sellers, Birmingham, aged 65, died recently of coronary occlusion and general arteriosclerosis.

ARKANSAS

Desha County Medical Society has elected Dr. J. H. Hellums, Dumas, President; Dr. Chas. G. Leverett, Eudora, Vice-President; and Dr. Goree Biscoe, Dumas, Secretary-Treasurer.

Franklin County Medical Society has elected Dr. W. C. Porter, President; Dr. E. W. Pillstrom, Vice-President; and Dr. W. H. Gibbons, Secretary-Treasurer, all of Ozark.

Greene County Medical Society has elected Dr. Earle D. McKelvey, Paragould, President; Dr. J. J. Hudgins, Paragould, Vice-President; and Dr. M. A. Kellett, Secretary-Treasurer.

Grant County Medical Society has elected Dr. O. R. Kelly, Sheridan, President; and Dr. M. F. Kelly, Secretary-Treasurer.

Independence County Medical Society has elected Dr. V. D. McAdams, Cord, President; Dr. Rector Hooper, Batesville, Vice-President; and Dr. Paul Gray, Batesville, Secretary-Treasurer.

Jefferson County Medical Society has elected Dr. Allen R. Russell, President; Dr. H. T. Capel, Vice-President; and Dr. B. D. Lunck, Jr., Secretary-Treasurer, all of Pine Bluff.

Johnson County Medical Society has elected Dr. Guy Shrigley, President; Dr. J. M. Kolb, Vice-President; and Dr. G. R. Siegel, Secretary-Treasurer, all of Clarksville.

Lawrence County Medical Society has elected Dr. J. B. Elders, Walnut Ridge, President; Dr. E. J. Cruse, Black Rock, Vice-President; and Dr. Chas. D. Tibbels, Black Rock, Secretary-Treasurer.

Lee County Medical Society has elected Dr. C. W. Chaffin, Moro, President; and Dr. W. C. Hays, Jr., Hot Springs National Park, Secretary-Treasurer.

Madison County Medical Society has elected Dr. C. J. Martin, President; and Dr. Fred Youngblood, both of Huntsville, Secretary-Treasurer.

Miller County Medical Society has elected Dr. R. W. Pickett, President; Dr. B. C. Middleton, Vice-President; and Dr. Karlton H. Kemp, Secretary-Treasurer, all of Texarkana.

Pope County Medical Society has elected Dr. Ellis Gardner, President; Dr. J. Arnold Henry, Vice-President; and Dr. Brooks R. Teeter, Secretary-Treasurer, all of Russellville.

Randolph County Medical Society has elected Dr. J. R. Loftis, Pocahontas, President; Dr. R. O. Smith, Biggers, Vice-President; and Dr. M. A. Baltz, Pocahontas, Secretary-Treasurer.

Sevier County Medical Society has elected Dr. R. C. Dickinson, Horatio, President; Dr. C. A. Archer, DeQueen, Vice-President; and Dr. C. E. Kitchens, DeQueen, Secretary-Treasurer.

White County Medical Society has elected Dr. W. R. Felts, Judsonia, President; Dr. A. J. Dunklin, Searcy, Vice-President; and Dr. S. J. Allbright, Secretary-Treasurer.

Dr. Vida Gordon, after a number of years with the U. S. Public Health Service, is now located in Little Rock as Assistant Professor of Pediatrics, University of Arkansas School of Medicine.

Benton County Medical Society has elected Dr. J. S. Thompson,

Gravette, President; Dr. W. A. Moore, Rogers, Vice-President; and Dr. George M. Love, Rogers, Secretary-Treasurer.

Drew County Medical Society has elected Dr. Lewis Hyatt, Little Rock, President; Dr. J. B. Holder, Monticello, Vice-President; and Dr. Robert F. Hyatt, Jr., Monticello, Secretary-Treasurer.

Hot Springs County Medical Society has elected Dr. T. L. Hodges, Bismarck, President; Dr. E. H. McCray, Malvern, Vice-President; and Dr. C. S. Pool, Malvern, Secretary-Treasurer.

Dr. B. H. Custer, North Little Rock, has moved to Botkinburg.

Dr. J. R. Kitley, Mayflower, has been elected Mayor of his city for the twenty-first consecutive term.

Dr. Homer A. Higgins, Little Rock, has been appointed Medical Director of Selective Service in Arkansas and Oklahoma.

Dr. H. King Wade, Jr., Little Rock, is Chief of Urology, General Hospital No. 29, Seoul, Korea.

Arkansas State Board of Health has appointed as part-time Venereal Disease Consultants Dr. Virgle E. Lyons, Little Rock; Dr. Joe E. Beasley, Blytheville; and Dr. M. L. Skaller, Blytheville.

Dr. C. A. Churchill, Dr. F. Q. Wyatt, Dr. Hickman Calaway, Dr. J. J. Monfort and Dr. Rector Hooper have formed the North Arkansas Clinic at Batesville.

Dr. Charles S. Holt, Fort Smith, has been elected a Trustee of the Mid-West Hospital Association.

Dr. Sam Phillips, Little Rock, is taking postgraduate work in pediatrics in Chicago.

Dr. William Payton Kolb, Little Rock, and Miss Margaret Lucille Sparks, Asheville, North Carolina, were married March 9.

Deaths

Dr. J. P. Baker, West Helena, aged 72, died March 28.

Dr. Albert W. Rye, Russellville, aged 70, died recently of pneumonia.

Dr. Martin Edward Staudenmayer, Leachville, aged 60, died recently of heart disease.

DISTRICT OF COLUMBIA

Dr. George Russell Callender, Brigadier General, Medical Corps, U. S. Army, Commandant of the Medical Department Professional Service Schools, Washington, has been awarded the Richard Pearson Strong Paladium Medal by the American Foundation for Tropical Medicine, with an honorarium of $500, both gifts of the Winthrop Chemical Company, New York.

Selective Service Medals and certificates were presented March 19, to the following who helped formulate and administer the Selective Training and Service Act of 1940 without compensation: Dr. Winfred Overholser, Dr. Henry C. Macatee, Dr. Albert N. Baggs, Dr. Roscoe W. Hall, Dr. F. X. McGovern, and Mr. Theodore Wiprud, all of Washington.

Dr. Oscar B. Hunter, Washington, was recently appointed Adjunct Professor of Medicine, Georgetown University School of Medicine.

Dr. Wallace M. Yater, has been appointed Civilian Consultant to the Army Institute of Pathology. He will continue in private practice.

Dr. Alfred Golden, Washington, has been named Assistant Professor of Pathology, University of Tennessee College of Medicine, and Director of Laboratories, Baptist Memorial Hospital, Memphis, Tennessee.

Dr. John W. Lawlah, Washington, resigned April 1 as Dean and Professor of Radiology, Howard University School of Medicine.

A Commission composed of five army and civilian experts have been appointed to study prosthetic progress in Europe, at the direction of Secretary of War Patterson. Heading the unit is Dr. Leonard T. Peterson, Colonel, Medical Corps, Washington, Chief of the amputation and prosthetic unit, Surgeon General's Office; Dr. Paul E. Klopsteg, Director of Research, Northwestern University Technological Institute; Lieutenant Colonel Robert G. F. Lewis, Ordnance Department of New York City, Engineer assigned to the Surgeon General's Office; Dr. Rufus H. Alldredge, Lieutenant Colonel, Medical Corps, New Orleans, Louisiana, Chief of the Amputation Section, England General Hospital, Atlantic City, New Jersey; and Mr. Edmond N. Wagner, San Marino, California, Consulting Engineer.

Dr. Robert W. Webb, Dallas, Texas, has been appointed Chief Psychiatrist in the Mental Hygiene Clinic to be installed in the Washington Regional Office of the Veterans' Administration.

Dr. Merton Louis White and Miss Catherine Margaret Field, both of Washington, were married recently.

Deaths

Dr. Oliver Van Auken Emery, Washington, aged 76, died recently of heart disease.

Dr. Edwin Atkins Merritt, Washington, aged 66, died April 9.

Dr. Alexander B. Moore, Washington, aged 63, died March 8.

Dr. Amy Jean Rule, Washington, aged 76, died recently.

Dr. Albert Perkins Tibbets, Washington, aged 66, died recently of cerebral hemorrhage.

FLORIDA

Dr. Robert B. McIver, Jacksonville, was elected President-Elect of the Southeastern Section of the American Urological Association at its recent annual meeting.

Dr. Frederick J. Waas, Jacksonville, was elected Vice-President of the Southeastern Surgical Congress which met in Memphis, Tennessee, recently.

Dr. Abraham R. Hollender, recently acting head of the Department of Otolaryngology, University of Illinois College of Medicine, Chicago, has been granted retirement by the University with the rank of Professor of Otolaryngology Emeritus and he has resumed practice in Miami Beach.

Dr. T. Philip Dann, Captain Medical Corps, U. S. Army, St. Petersburg, has been awarded the Bronze Star.

Dr. Clarence L. Anderson, Tampa, and Miss Cicely Ann Law, Brentwood, Maryland, were married March 23.

Dr. Burt Wayne Marks and Miss Jeannette Lucille Wolf, both of Miami Beach, were married March 24.

Deaths

Dr. Walter Henry Conley, Lake Worth, aged 76, died recently of cerebral hemorrhage.

Dr. James Jesse Holes, Mount Dora, aged 73, died recently of pneumonia.

Dr. Warren Jacob Miller, Miami, aged 75, died recently of arteriosclerosis.

Dr. Harry Fuller Waite, Hollywood, aged 73, died recently of epithelioma of the right eye and face.

Dr. James William Wilson, Clearwater, aged 88, died recently of congestive heart failure and arteriosclerosis.

GEORGIA

Douglas County Medical Society has elected Dr. J. G. Busey, Austell, President; Dr. T. B. Taylor, Douglasville, Vice-President; and Dr. C. V. Vansant, Douglasville, Secretary-Treasurer.

Bibb County Medical Society has elected Dr. W. W. Baxley, President; Dr. C. N. Wasden, President-Elect; Dr. R. W. McAllister, Vice-President; and Dr. A. M. Phillips, Secretary-Treasurer, all of Macon.

Colquitt County Medical Society has elected Dr. R. M. Joiner, Moultrie, President; Dr. W. R. McGinty, Vice-President; and Dr. A. G. Funderburk, Secretary-Treasurer, all of Moultrie.

Coweta County Medical Society has elected Dr. W. H. Tanner, President; and Dr. M. F. Cochran, Secretary-Treasurer, both of Newnan.

Elbert County Medical Society has elected Dr. G. A. Ward, President; Dr. W. A. Johnson, Vice-President; and Dr. A. S. Johnson, Secretary-Treasurer, all of Elberton.

Georgia Public Health Association has installed Dr. Abe J. Davis, Augusta, President; and elected Dr. M. E. Winchester, Brunswick, President-Elect; Dr. J. A. Pickering, Albany, Vice-President; and Dr. L. G. Lenert, Atlanta, Secretary and Treasurer.

Emanuel County Medical Society has elected Dr. D. D. Smith, President; and Dr. C. E. Powell, Secretary-Treasurer, both of Swainsboro.

Forsyth County Medical Society had elected Dr. Rupert H. Bramlett, Jr., President; Dr. Marcus Mashburn, Sr., Vice-President; and Dr. Courtney C. Brooks, Secretary-Treasurer, all of Cumming.

Franklin County Medical Society has elected Dr. Stewart D. Brown, Royston, President; Dr. E. T. Pool, Lavonia, Vice-President; and Dr. B. T. Smith, Secretary-Treasurer.

Glynn County Medical Society has elected Dr. H. M. Coe, President; Dr. S. P. McDaniel, Vice-President; and Dr. Thomas W. Collier, Secretary-Treasurer, all of Brunswick.

Crisp County Medical Society has elected Dr. H. J. Williams, President; Dr. Charles Adams, Vice-President; and Dr. A. J. Whelchel, Secretary-Treasurer, all of Cordele.

Habersham County Medical Society had elected Dr. J. B. Jackson, Clarksville, President; Dr. Bruce Swain, Clarksville, Vice-President; and Dr. T. H. Brabson, Cornelia, Secretary-Treasurer.

Hall County Medical Society has elected Dr. Jesse L. Meeks, Gainesville, President; Dr. W. R. Garner, Vice-President; and Dr. H. H. Lancaster, New Holland, Vice-President.

Haralson County Medical Society has elected Dr. O. D. King, President; and Dr. C. H. Allen, Secretary-Treasurer, both of Bremen.

Hart County Medical Society has elected Dr. A. O. Meredith, Hartwell, President; and Dr. G. T. Harper, Dewy Rose, Secretary-Treasurer.

Henry County Medical Society has elected Dr. R. V. Brandon, President; and Dr. A. W. Carter, Jr., Secretary-Treasurer, both of McDonough.

Jasper County Medical Society has elected Dr. L. Y. Pittard, Monticello, President; Dr. F. S. Belcher, Monticello, Vice-President; and Dr. E. M. Lancaster, Shady Dale, Secretary-Treasurer.

Continued on page 62

FIT

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Continued from page 526

Jenkins County Medical Society has elected Dr. H. G. Lee, President; Dr. Cleveland Thompson, Vice-President; and Dr. Q. A. Mulkey, Secretary-Treasurer, all of Millen.

South Georgia Medical Society (Berrien, Clinch, Cook, Echols, Lanier, and Lowndes) has elected Dr. R. L. Hutchinson, Adel, President; Dr. T. H. Smith, Valdosta, Vice-President; and Dr. Marion E. Farbar, Valdosta, Secretary-Treasurer.

Meriwether-Harris Counties Medical Society has elected Dr. V. H. Bennett, Gay, President; Dr. J. A. Johnson, Manchester, Vice-President; and Dr. R. B. Gilbert, Secretary-Treasurer.

Dr. C. W. Roberts, Atlanta, represented the Medical Association of Georgia at the first annual meeting of the National Conference on Rural Health, held recently in Chicago.

Southeastern Section of the American Urological Association, at its recent tenth annual meeting held in Augusta, installed Dr. Hubert K. Turley, Memphis, Tennessee, President; and elected Dr. Robert B. McIver, Jacksonville, Florida, President-Elect; Dr. William M. Coppridge, Durham, North Carolina, Vice-President; and Dr. Harold P. McDonald, Atlanta, Secretary-Treasurer.

Selective Service Medals and Certificates were recently presented to the following for distinguished and meritorious service for the nation in time of war without compensation; Dr. J. H. Terrell, Dr. C. L. Ayers, and Dr. H. L. White, all of Toccoa.

The following have been appointed to the newly created State Workmen's Compensation Medical Board; Dr. Hugh Hailey, Chairman, Dr. John Funke, Dr. Albert Rayle and Dr. Jack C. Norris, all of Atlanta; and Dr. Ernest F. Wahl, Thomasville.

Dr. Charles Andrews, Canton, has joined the Coker Hospital Staff at Canton.

Dr. W. D. Cagle, formerly of Griffin, succeeds Dr. Charles Engleking as Whitfield County Public Health Commissioner, now residing in Dalton.

Dr. Zack C. Cowan, Atlanta, has retired after twenty-nine years' practice of medicine and surgery, and now resides in Clearwater, Florida.

Dr. Arthur W. Hill, Thomasville, has taken charge of the Thomas-Grady Counties Health Unit.

Dr. Fred C. Hodgson, Atlanta, has resigned as Chairman of the Department of Orthopedics, Emory University School of Medicine, and has been named Professor Emeritus.

Coleman Memorial Hospital, Eastman, has been purchased from Dr. Warren A. Coleman by Dr. J. Palmer Mayo and Dr. James L. Thompson, both of Eastman.

Dr. James R. McCord, Atlanta, former Chairman of the Department of Obstetrics, Emory University School of Medicine, has resigned and has been named Professor Emeritus.

Dr. Ralph Hogshead, Jr., Albany, and Miss Ruth Cheney, Morgan, were married recently.

DEATHS

Dr. Clifford Brannen, Atlanta, aged 56, died March 7.

Dr. McIntosh Marcus Burns, Pelham, aged 53, died March 10 of a heart attack.

Dr. Ralph Montgomery Goss, Athens, aged 67, died March 13.

Dr. Andrew J. Montgomery, Resaca, aged 73, died recently of heart disease.

KENTUCKY

Dr. E. L. Henderson, Louisville, was installed President of the Southeastern Surgical Congress which met recently in Memphis, Tennessee.

Dr. Charles E. Youmans, Frankfort, has been appointed Superintendent, Darnall General Hospital, Danville, recently reacquired for State control.

Dr. and Mrs. D. Randolph Skaggs, Royalton, recently observed their fiftieth wedding anniversary.

Dr. Edward C. Humphrey, Harrodsburg, succeeds Dr. Robert J. Griffin, Lexington, as physician of the University of Kentucky Health Service.

Dr. Clement V. Hiestand, Campbellsville, has completed fifty years in the practice of medicine, twenty-five of which were spent as Health Officer of Taylor County.

DEATHS

Dr. Amplias Warrick Davis, Madisonville, aged 71, died March 27 of cardiovascular renal disease.

Dr. John William McMahan, Bedford, aged 80, died recently of arteriosclerotic heart disease.

LOUISIANA

Dr. Murphy P. Martin, St. Martinville, has been appointed Health Unit Doctor for Iberia Parish and also to act as Health Officer for St. Martin Parish. He will reside in New Iberia.

Continued on page 64

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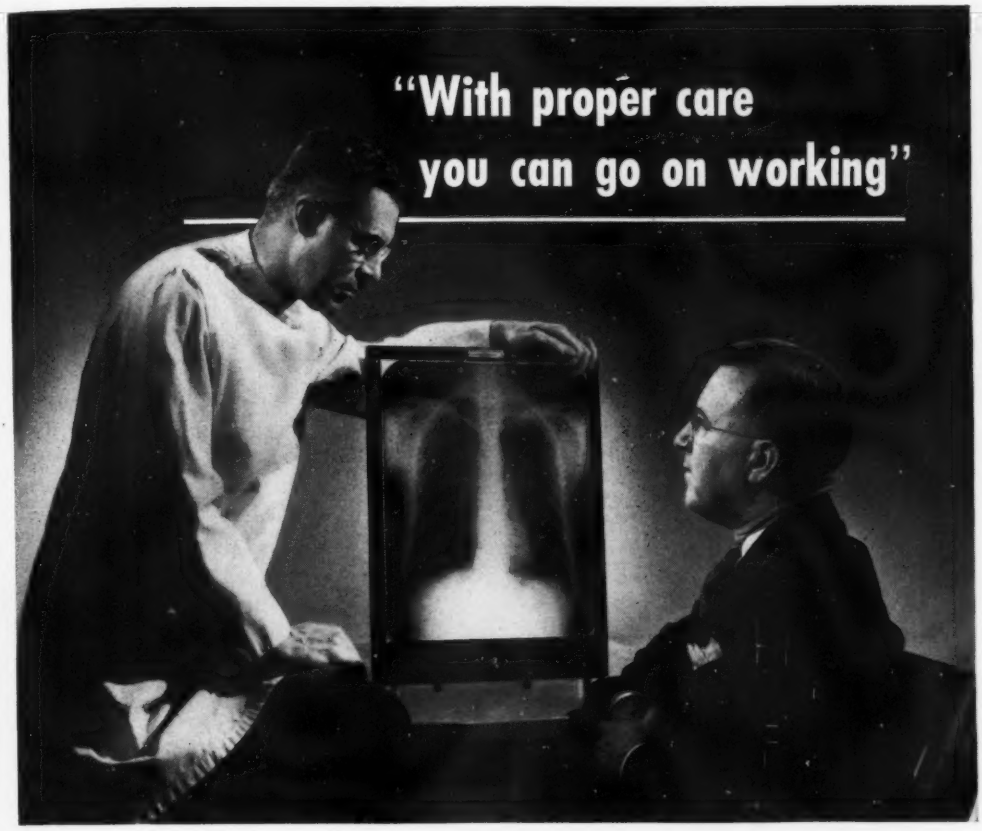

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Continued from page 62

Dr. Marcus J. Magruder, New Orleans, has resigned from the Board of Administrators of the Tulane Educational Fund after serving thirty-one years.

Dr. Samuel Eichold, New Orleans, has moved to Mobile, Alabama.

Dr. Donald T. Imrie, New Orleans, has moved to Vicksburg, Mississippi.

Dr. Max C. Igloe, Major, Medical Corps, U. S. Army, De Ridder, was recently presented the Bronze Star.

Dr. Leonard Chatelain, Cut Off, and Miss Janet Alma Stokes, Dunkie, were married recently.

Deaths

Dr. Henry Nathan Blum, Baton Rouge, aged 70, died April 13.

Dr. Eugene Davis, New Orleans, aged 75, died recently of cardiorenal disease and arteriosclerosis.

Dr. Lee Landruf Collins, Port Barre, aged 65, died recently of cardiac failure.

Dr. J. F. Points, New Orleans, aged 66, died April 8.

MARYLAND

Allegany-Garrett County Medical Society has elected Dr. Frank U. Davis, President; Dr. Abraham S. Mirkin, Vice-President; Dr. Arthur T. Jones, Secretary; and Dr. Clay E. Durett, Treasurer, all of Cumberland.

Anne Arundel County Medical Society has elected Dr. John M. Claffy, President, Annapolis; Dr. Frances E. Weitzman, Annapolis, Vice-President; Dr. E. G. Lindhardt, Eastport, Secretary; and Dr. Elizabeth Peabody Trevett, Annapolis, Treasurer.

Baltimore City Medical Society has elected Dr. Alfred Blalock, President; Dr. Charles Reid Edwards, Vice-President; Dr. Samuel McLanahan, Secretary; and Dr. J. Albert Chatard, Treasurer, all of Baltimore.

Baltimore County Medical Society has held over the 1945 officers as follows: Dr. John S. Green, Jr., Towson, President; Dr. William H. Warthen, Towson, Vice-President; Dr. William R. Dunton, Jr., Catonsville, Secretary-Treasurer.

Calvert County Medical Society has elected Dr. Earl S. Coster, Solomons, President; Dr. George J. Weems, Huntington, Vice-President; and Dr. Hugh W. Ward, Owings, Secretary-Treasurer.

Caroline County Medical Society has elected Dr. Harold B. Plummer, Preston, President; Dr. W. E. Lennon, Federalsburg, Vice-President; and Dr. Walter B. Johnson, Denton, Secretary-Treasurer.

Carroll County Medical Society has elected Dr. Kenneth B. Jones, Sykesville, President; Dr. R. S. McVaugh, Taneytown, Vice-President; and Dr. J. Stanley Grabill, Mt. Airy, Secretary-Treasurer.

Cecil County Medical Society has held over the 1945 officers as follows: Dr. J. Herbert Bates, Elkton, President; Dr. S. Arthur Kotz, Rising Sun, Vice-President; and Dr. Richard C. Dodson, Rising Sun, Secretary-Treasurer.

Charles County Medical Society has elected Dr. Frank A. Susan, Indian Head, President; Dr. Edward J. Edelen, La Plata, Vice-President; and Dr. James L. MacKavanagh, La Plata, Secretary-Treasurer.

Dr. Joseph C. Presti, Baltimore, and Miss Angelina Alioto, San Francisco, California, were married recently.

Deaths

Dr. Walter Edward Dandy, Baltimore, aged 60, died April 19, of coronary occlusion.

Dr. Daniel Sebastian Fisher, Hughesville, aged 53, died recently of coronary thrombosis.

Dr. Joseph Edward Norris, Baltimore, aged 51, died recently of injuries to the chest received in an automobile accident.

MISSISSIPPI

Dr. Paul G. Gamble, Greenville, was elected President-Elect of the Mississippi State Medical Association held recently in Jackson.

Deaths

Dr. Cap James Carter, Magee, aged 57, died recently of pneumonia.

Continued on page 66

Stimulation of the Entire Tract . . .

VALUABLE IN OVERCOMING HABITUAL CONSTIPATION

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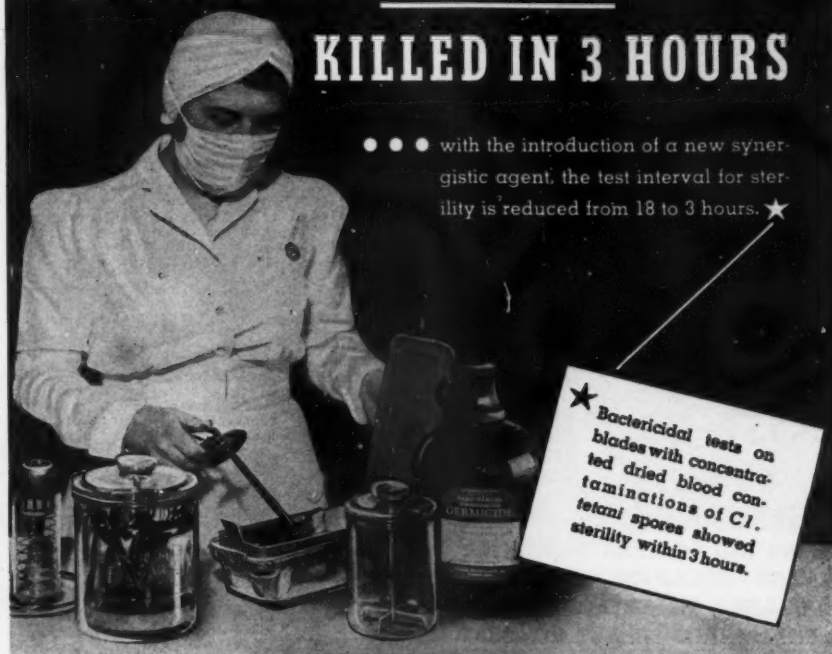

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Continued from page 64

Dr. Lewis C. Jones, Madison Station, aged 84, died recently of arthritis.

Dr. James William Eckford, Starkville, aged 72, died recently of coronary occlusion.

Dr. John G. Prine, Morgantown, aged 77, died recently.

Dr. Fred M. Sandifer, Greenwood, aged 68, died April 19.

MISSOURI

Missouri State Medical Association at its recent meeting installed Dr. Howard B. Goodrich, Hannibal, President; and elected Dr. Morris B. Simpson, Kansas City, President-Elect Dr. Daniel L. Sexton, St. Louis, Dr. Winfred L. Post, Joplin, and Dr. Gaylord T. Bloomer, St. Joseph, Vice-Presidents.

Kansas City Association of Railway and Industrial Physicians and Surgeons at a meeting held April 5 elected Dr. G. A. Roy, President; Dr. E. P. Heller, Vice-President; and Dr. Carl N. Lindquist, Secretary, all of Kansas City.

Missouri Chapter of the College of Chest Physicians at a meeting held March 24 in St. Louis elected Dr. Sam H. Snider, Kansas City, President; Dr. W. W. Buckingham, Kansas City, Vice-President; and Dr. A. J. Steiner, St. Louis, Secretary-Treasurer.

Dr. Harry L. Alexander, St. Louis, has been appointed a part-time Chief of Section in the Professional Services Division of the Veterans Administration. He will serve as Consultant and Adviser on Allergy.

Dr. Frederick A. Jostes, St. Louis, and Miss Barbara Donohoe, Menlo Park, California, were married recently.

Dr. Edward O. Loxterkamp and Miss Rosemary Grellner, both of St. Louis, were married recently.

Dr. Luis Carlos Priete, Jr., St. Louis, and Miss Helen Hunter Rhodes, Mobile, Alabama, were married March 2.

Dr. Hugh Browning Walker and Miss Annette Coffey, both of Kansas City, were married recently.

DEATHS

Dr. William E. Angell, Rocheport, aged 72, died recently.

Dr. Charles Abbott Beach, Elijah, aged 63, died recently of chronic nephritis.

Dr. Harry G. Bristow, St. Louis, aged 57, died recently of coronary thrombosis.

Dr. William H. Becker, St. Louis, aged 70, died recently.

Dr. George K. Campbell, Kansas City, aged 41, died recently.

Dr. Carl E. Dudley, St. Louis, aged 73, died March 26.

Dr. Lucius M. Dillman, Houston, aged 41, died recently.

Dr. William Waddell Duke, Kansas City, aged 62, died recently.

Dr. A. J. Drake, Lancaster, aged 61, died recently.

Dr. Arthur D. Ferguson, Benton, aged 71, died recently.

Dr. Frank J. Hall, Kansas City, aged 79, died recently.

Dr. Edward L. Hume, Bourbon, aged 81, died recently.

Dr. Franklin E. Jacobi, St. Louis, aged 67, died April 2.

Dr. Clarence A. McGuire, Kansas City, aged 61, died recently.

Dr. James R. Northcutt, Knox City, aged 90, died recently.

Dr. William F. O'Malley, Webster Groves, aged 59, died recently.

Dr. William R. Strickland, Rockport, aged 76, died recently.

NORTH CAROLINA

Dr. William M. Coppridge, Durham, was elected Vice-President of the Southeastern Section of the American Urological Association at its recent annual meeting.

Eighth District County Medical Society has elected Dr. Roy C. Mitchell, President; Dr. Edward C. Ashby, Vice-President; and Dr. Robert M. Caldwell, Secretary-Treasurer, all of Mt. Airy.

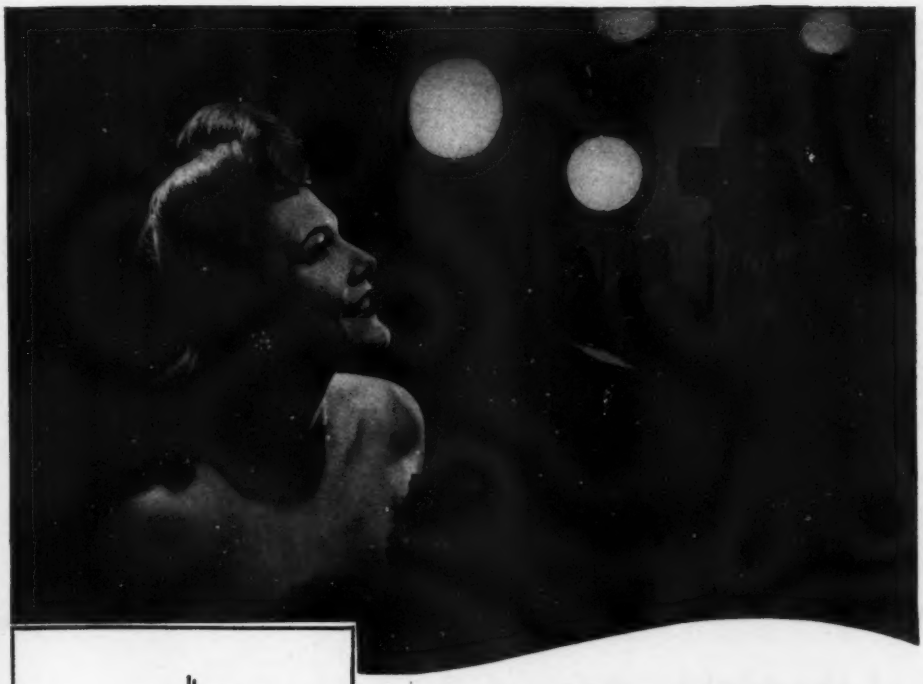
Burke County Medical Society has elected Dr. James W. Vernon, Morganton, President; Dr. Louis G. Beall, Black Mountain, Vice-President; and Dr. G. L. Donnelly, Chapel Hill, Secretary-Treasurer.

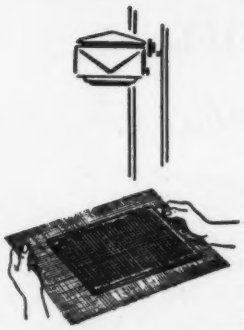
Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, has received from Gordon Gray, son of the late Bowman Gray, a gift of $125,000, the greater portion of which will be used to develop a Department of Psychiatry.

Dr. Lloyd J. Thompson, formerly a member of the staff of the Department of Psychiatry of Yale University School of Medicine, has been elected Professor of Psychiatry and Director, Department of Neuropsychiatry, Bowman Gray School of Medicine of Wake Forest College, Winston-Salem.

Dr. Robert P. Morehead, Winston-Salem, has been appointed Educational Director for the North Carolina Division of the Field Army of the American Cancer Society.

Continued on page 68





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BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Continued from page 66

Dr. Ralph T. Hinton, Jr., formerly of Payson, Illinois, has joined the staff of the State Department of Public Welfare as Senior Psychologist with the Division of Psychiatric and Psychological Services.

Dr. Orville E. Bell, Richlands, has moved to Rocky Mount.

Dr. C. H. Hemphill, formerly of Artesia, New Mexico, has located at Highlands.

Dr. Davis L. Moore, Winterville, has moved to Greenville.

Dr. Warwick T. Brown, Captain, Medical Corps, U. S. Navy, Kinston, Veteran of both World Wars, has assumed duties as head of the 600-bed Marine Hospital, Quantico, Virginia.

Dr. J. J. Busby, Salisbury, on March 19, had three sons graduated from Johns Hopkins Medical School, Baltimore: Dr. George F., Dr. Julian, and Dr. Trent Busby, the first time in the history of the institution that three brothers received medical degrees on the same date.

Dr. G. Greenleaf Caldwell, who recently resigned from the staff of the North Carolina Sanatorium, succeeds Dr. W. N. McKenzie as Health Officer for Stanly County.

Dr. Clement C. Clay, Atlanta, Georgia, has been appointed Executive Secretary, North Carolina Medical Care Commission.

Dr. Harry Duff Riddle, Gastonia, and Miss Mary Margaret Phillips, Belton, South Carolina, were married recently.

Dr. Walter William Magruder, Durham, and Miss Kathryn Dorsett Marley were married recently.

Dr. Wiley D. Forbus, Durham, was elected President of the American Association of Pathologists and Bacteriologists at its recent meeting held in Chicago.

Deaths

Dr. Thomas O. Coppedge, Nashville, aged 65, died March 12.

Dr. Albert Corpening, Granite Falls, aged 30, was killed in an automobile accident March 16.

Dr. H. George Eppstein, Goldsboro, aged 43, died March 14.

Dr. C. G. Ferebee, Morehead City, aged 70, died recently.

Dr. Frederic Moir Hanes, Durham, aged 63, died recently.

Dr. Milton Joseph Rosenau, Chapel Hill, aged 77, died April 9.

OKLAHOMA

Dr. Patrick P. T. Wu, Shanghai, China, a graduate of the University of Virginia, will be Instructor for the postgraduate course in Surgical Diagnosis which will open in Tulsa, June 17.

Dr. Robert H. Bayley, Oklahoma City, has been elected Chairman of the Southern Section of the American Federation for Clinical Research.

Deaths

Dr. Robert Dow Lowther, Norman, aged 77, died recently of heart disease.

SOUTH CAROLINA

Abbeville County Medical Society has elected Dr. Ellis Poliakoff, Abbeville, President; Dr. A. C. Ward, Calhoun Falls, Vice-President; and Dr. Francis C. McLane, Abbeville, Secretary-Treasurer.

Dr. J. Gorden Seastrunk, Columbia, has been awarded fellowship in the American College of Chest Physicians.

Annual Postgraduate Seminar of the Alumni Association, Medical College of the State of South Carolina, will be held in Charleston, November 5-7.

Dr. Robert Wilson Ball, Columbia, has resigned as Director, Division of Maternal and Child Health to return to private practice.

Dr. Hilla Sherill, Associate Director, Division of Maternal and Child Health for the past five years during military leave of absence of the Director, was made Director on March 15.

Dr. Gertrude R. Holmes, formerly Chief of the Gastro-Enterology Section, Wakeman General Hospital, recently resumed practice at Greenville.

Dr. J. I. Converse, Greenville, recently appointed Greenville County Physician, has also been made County Pathologist.

Dr. T. H. Chappell, Greenville, has resigned as Pathologist of the Greenville General Hospital and has accepted a position in Houston, Texas.

Continued on page 72

All of the Light...None of the Reflexes... with the *AO Polaroid* Giantscope*

For those seeking an ophthalmoscope with which to obtain a clearer view of the fundus, we offer the AO Polaroid Giantscope as the ideal instrument. The useful illumination reaching the eye is increased over that from ordinary ophthalmoscopes and the undesirable corneal reflex is completely eliminated.

In addition to the unique polarizing system, yellow and red-free filters are furnished as integral parts easily turned into position. Vergence of the light beam is variable with adjustable condensers.

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A HELPFUL CONVALESCENT AID...

THE AMERICAN-COMPER Invalid and Orthopedic WALKER

OF RECOGNIZED clinical and economic value in orthopedic, fracture, paralytic and post-operative cases at the time convalescent progress permits placement on ambulatory service.

1. Tends to overcome fear psychosis in patients . . . inspires confidence against tripping or falling.
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EATON LABORATORIES Inc.
NORWICH NEW YORK

announces an innovation in

CONCEPTION CONTROL

Many failures in conception control are due to *one cause*: failure of the patient to use the prescribed method *faithfully*. This conclusion is abundantly supported by the literature. The great need in conception control is to find a method more acceptable to patients, yet effective.

Now Eaton Laboratories announces such a method . . . a suppository which (a) is quick, easy, pleasant to use; (b) quickly forms a barrier film capable of occluding the cervical os; (c) kills sperm in less than one minute.

Lorophyn Suppositories

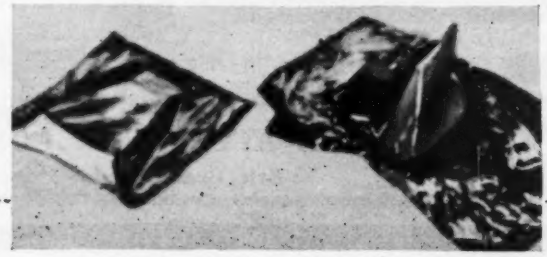
A Lorophyn Suppository can be unwrapped and inserted in the vagina in a few seconds. There it melts in a matter of minutes to form an emulsion with cervical fluid. Naturally, this ease and speed of use make the method highly acceptable to patients.

The Barrier Film

Fig. 1 shows the melted suppository adhering to the cervix, in the form of a film which occludes the uterine os. This film serves the same purpose as the diaphragm in the diaphragm-jelly method of conception control. Fig. 2 demonstrates the tenacity of this film; note that after intercourse the film still occludes the os.

These photographs were made possible by the brilliant technic of Samuel L. Siegler, M.D., Brooklyn, N. Y.

Below is shown Lorophyn Suppository in hermetically sealed, leak-proof, aluminum foil wrapper . . . also the unwrapped suppository.



Spreading Properties

In the vagina, Lorophyn Suppository melts in the vagina, it diffuses over the region where protection is needed. This has been demonstrated by X-ray photographs. Reproductions of these films are available on request.

Spermicidal Action

Lorophyn Suppositories contain .05 per cent phenylmercuric acetate, one of two compounds which have been referred to as the most effective spermicides known (1). In vitro tests indicate that the melted suppository, when thoroughly mixed in a tuberculin syringe with human semen and saline in dilution of 1:10, kills sperm in less than one minute.

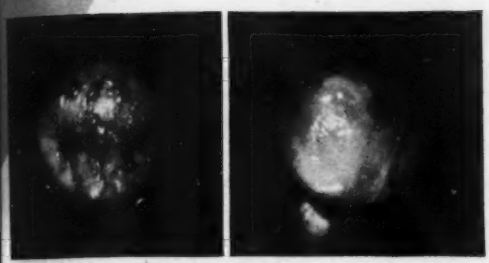


Fig. 1 (left) shows Lorophyn Suppository 5 minutes after insertion in vagina; note the barrier film occluding the uterine os. Fig. 2 (right) shows same cervix 4 hours post coitum; the uterine os is still occluded.

Physical Properties

The base of Lorophyn Suppositories is a novel combination of synthetic wax and glyceride. The suppository is odorless, does not grease the fingers nor stain, and is pleasant to handle. It melts at body temperature, and during hot weather may liquefy. No leakage occurs from the hermetically sealed metal foil wrapper, and the suppository may be resolidified by immersion in tap water.

Clinical Effectiveness

More than four years of laboratory research and clinical investigation have been devoted to the development of Lorophyn Suppositories. In clinical evaluations covering hundreds of cases, Lorophyn Suppositories have given results which compare favorably with those obtained with the jelly and the diaphragm-jelly methods as reported in the literature (2) (3). Clinical studies of Lorophyn Suppositories are being continued and enlarged.

Conclusions

From the above, it may be concluded that a method of conception control is now available which, because of its simplicity and convenience, should receive an extraordinarily high degree of patient-acceptance. This new suppository places a spermicidal barrier where protection is needed and is capable of killing sperm in less than a minute. Clinical evaluation to date indicates that this is a highly effective method of conception control.

Package Information

Lorophyn Suppositories, each weighing 3 Gm., are wrapped separately and hermetically sealed in aluminum foil. They are packed one dozen to the box. Directions for insertion are included.

Further Data

Additional data will gladly be supplied to physicians who address The Medical Director. Eaton Laboratories, Inc., Norwich, N. Y.

(1) Baker, J. R., Ranson, R. M., & Tynen, J.: Lancet 2:882, 1938.
(2) Seibel, R. E.: Human Fertility 9:43, 1944.
(3) Garvin, D. O.: Human Fertility 9:73, 1944.

Lorophyn suppositories

Continued from page 68

Surgical Service of the Columbia Hospital, Columbia, has organized with Dr. George H. Bunch as Chief. The Committee to obtain residence and to arrange for credited resident training is composed of: Dr. O. B. Mayer, Dr. George B. McCutchen, and Dr. Robert Durham.

Dr. Harold Leon Poole, Spartanburg, and Miss Dora Bell Barkalow, Atlanta, Georgia, were married recently.

Dr. John Clarence Taylor, Anderson, and Miss Maxine Carpenter, Opelousas, Louisiana, were married recently.

Deaths

Dr. John L. Fennell, Waterloo, aged 69, died recently.

TENNESSEE

Dr. Ernest W. Goodpasture, Professor of Pathology and Dean of the Vanderbilt University School of Medicine, Nashville, received on May 15 the 1946 Passano Foundation Award, a $5,000 cash award, "for his original development of the method for propagation of viruses in pure culture by inoculation of chick embryos and for his outstanding contributions to advancement of knowledge of the cell-parasite relationship in bacterial and virus infection," which was presented in the Osler Hall of the Medical and Chirurgical Faculty of Maryland, Baltimore. The award was created by the Foundation, which was established in 1944 by the Williams and Wilkins Company, Baltimore, to aid in the advancement of medical research, especially research that bears promise of clinical application.

Dr. Herbert Acuff, Knoxville, was elected President-Elect of the Southeastern Surgical Congress which met recently in Memphis.

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Conserves mother's time and energy in straining fresh vegetables and fruits. With just a few twists of the wrist, the Foley Food Mill separates fibres and hulls and purees any cooked food fine enough for the smallest baby or for any adult diet — peas, carrots, beets, string beans, spinach, apple sauce, prunes. Made of steel, rust- and acid-resistant. At department and hardware stores.

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Name_____

Address_____

Dr. Douglas H. Sprunt, Memphis, was elected Vice-President of the American Society for Experimental Pathology at its recent meeting in Atlantic City.

Dr. Benjamin H. Robins, Associate Professor of Pharmacology, Vanderbilt University School of Medicine, Nashville, is in charge of a newly created Department of Anesthesiology at Vanderbilt.

Dr. John C. Burch, Colonel, Medical Corps, U. S. Army, Nashville, has been awarded the Legion of Merit.

Monroe County Medical Society has elected Dr. J. E. Young, President; Dr. T. M. Roberts, Vice-President; and Dr. D. F. Heuer, Secretary, all of Sweetwater.

Sumner County Medical Society has elected Dr. W. M. Dedman, President; Dr. W. B. Farris, Secretary, both of Gallatin.

Sullivan-Johnson Counties Medical Society has elected Dr. J. V. Hodge, President; Dr. H. O. Bolling, Secretary, both of Kingsport.

Washington and Carter Counties Medical Society has elected Dr. H. L. Monroe, Erwin, President; Dr. Hugh Swingle, Jr., Johnson City, Vice-President for Washington County; Dr. E. L. Caudill, Jr., Elizabethton, Vice-President for Carter County; and Dr. Charles R. Wofford, Johnson City, Secretary.

Wilson County Medical Society has elected Dr. J. R. Doak, Watertown, President; Dr. Phillips Turner, Lebanon, Vice-President; and Dr. R. C. Kash, Lebanon, Secretary.

Dr. Wayne P. Hyatt, Tazewell, and Miss Louise Windham, University, Mississippi, were married recently.

Deaths

Dr. Walter Roland Cox, Memphis, aged 60, died recently.

Dr. Wilbul B. Payne, Kingsport, aged 45, died recently.

Dr. Benjamin Franklin Turner, Memphis, aged 85, died recently of myocardial failure and peripheral vascular embolus.

Dr. John T. Moss, Memphis, aged 67, died recently.

TEXAS

Lubbock-Crosby Counties Medical Society has elected Dr. Albert C. Barsh, President; Dr. Pauline A. Walker, Vice-President; and Dr. Martin H. Benson, Secretary-Treasurer, all of Lubbock.

McLennan County Medical Society has elected Dr. H. T.

Continued on page 74

Classified Advertisements

PATHOLOGIST, Board Diplomate, competent and experienced in pathologic anatomy, frozen section diagnosis, clinical pathology and tropical diseases; professor, consultant and executive; laboratory director and research associate in distinguished organization; numerous publications, excellent references; age 40. Desire association with substantial hospital or accomplished clinical group. Write PGJ, care Southern Medical Journal.

HEALTH OFFICERS WANTED—Positions are open in Georgia for county and district commissioners of health. Salaries for experienced public health physicians range from $4,800 to $6,600. Salaries for physicians with public health training who are entering the field range from $3,960 to $4,920. Liberal travel allowances supplement these salaries. Tenure of office is assured by a merit system. License to practice medicine in Georgia is required. Ample opportunities for training are offered with liberal stipend while in training. Write T. F. Abercrombie, M.D., Director, State Health Department, State Office Building, Atlanta 3, Georgia, for application forms and full details.

TUBERCULOSIS CONTROL OFFICERS WANTED—A program of increased emphasis on the control of tuberculosis requires nine additional tuberculosis control officers in the Georgia Department of Public Health. Salaries range from $4,800 to $6,600 plus travel expenses, according to education, experience, duties assigned and length of service. Some positions are available for physicians experienced in tuberculosis diagnosis and treatment who do not yet have public health experience. Write T. F. Abercrombie, M.D., Director, State Health Department, State Office Building, Atlanta 3, Georgia, for application forms and full details.

RABBITS—Virgin does for hospital and medical use. State age desired. Price $2.50 each. Address Dalton Rabbit Farm, Rt. 1, Pineville, La.

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Continued from page 72

Aynesworth, President; Dr. F. William Hoehn, Vice-President; and Dr. A. O. Manske, Secretary-Treasurer, all of Waco.

Milam County Medical Society has elected Dr. T. L. Denson, Cameron, President; Dr. T. S. Barkley, Rockdale, Vice-President; and Dr. T. E. Crump, Cameron, Secretary-Treasurer.

Navarro County Medical Society has elected Dr. Dan B. Hamill, President; Dr. W. K. Logsdon, Vice-President; and Dr. W. R. Sneed, Secretary-Treasurer, all of Corsicana.

Nolan-Fisher-Mitchell Counties Medical Society has elected Dr. C. A. Rosebrough, Sweetwater, President; and Dr. T. J. Barb, Roby, Secretary-Treasurer.

Orange County Medical Society has elected Dr. E. W. Hawkins, President; Dr. T. O. Woolley, Orange, Vice-President; and Dr. G. Y. Swickard, Secretary-Treasurer.

Red River County Medical Society has elected Dr. Melvin Marx, Jr., President; Dr. James L. Wright, Vice-President; and Dr. Charles B. Reed, Secretary-Treasurer, all of Clarksville.

Tarrant County Medical Society has installed Dr. E. L. Howard, President; and has elected Dr. May Owen, President-Elect; Dr. W. B. West, Vice-President; and Dr. W. P. Higgins, Jr., Secretary-Treasurer, all of Fort Worth.

Taylor-Jones Counties Medical Society has elected Dr. William T. Sadler, Merkel, President; Dr. W. B. Adamson, Abilene, Vice-President; and Dr. Jack A. Crow, Abilene, Secretary-Treasurer.

Titus County Medical Society has elected Dr. T. S. Grissom, President; Dr. T. R. Bassett, Vice-President; and Dr. William A. Taylor, Secretary-Treasurer, all of Mt. Pleasant.

Travis County Medical Society has elected Dr. Charles P. Hardwicke, President; Dr. Oliver Suehs, Vice-President; and Dr. Henry L. Hilgartner, Secretary, all of Austin.

Washington County Medical Society has elected Dr. G. A. L. Kusch, Gay Hill, President; Dr. H. L. Steinbach, Brenham, Vice-President; and Dr. R. A. Hasskarl, Brenham, Secretary-Treasurer.

Wharton-Jackson-Matagorda-Fort Bend Counties Medical Society has elected Dr. W. S. Thiltgen, El Campo, President; Dr. R. G. Johnson, Newgulf, Vice-President; and Dr. J. M. Bauknight, Ganado, Secretary-Treasurer.

Wichita County Medical Society has elected Dr. Henry P. Ledford, President; Dr. J. B. Nail, Vice-President; and Dr. Robert L. Bailey, Secretary-Treasurer, all of Wichita Falls.

Williamson County Medical Society has elected Dr. W. C. Wedemeyer, Walburg, President; Dr. B. A. Kirkpatrick, Taylor, Vice-President; and Dr. Jay J. Johns, Taylor, Secretary-Treasurer.

Wood County Medical Society has elected Dr. T. H. Peterson, Mineola, President; Dr. F. B. Wheeler, Winnsboro, Vice-President; and Dr. T. B. Reed, Mineola, Secretary-Treasurer.

Young-Jack-Archer Counties Medical Society has elected Dr. D. E. Winstead, Graham, President; Dr. B. B. Griffin, Graham, Vice-President; and Dr. E. F. Meredith, Olney, Secretary-Treasurer.

North Texas District Society has elected Dr. C. B. Thayer, Gainesville, President; Dr. H. F. Carman, Dallas, Vice-President; and Dr. V. L. Tuck, Sherman, Secretary-Treasurer.

Dallas Southern Clinical Society at its annual conference held in March elected Dr. Milford O. Rouse, President; Dr. C. Frank Brown, Vice-President; Dr. Glenn D. Carlson, Secretary; and Dr. Howard K. Crutcher, Treasurer. Named to the Executive Committee: Dr. J. G. Kerr, Dr. Karl B. King, Dr. P. M. Girard, and Dr. Edwin L. Rippy.

A Medical Arts Building at Port Arthur is being planned by an organized company with the following officers: Dr. L. C. Heare, President; Dr. George Sladczyk, Vice-President; Dr. E. C. McKee, Secretary; and Dr. J. R. Kuebler, Treasurer, all of Port Arthur.

Dr. R. S. Lloyd, Director, City-County Health Unit, Corpus Christi, has resigned and will be head of the Venereal Disease Control Division of the State Health Department in Austin.

Continued on page 76

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LAMOTTE WUTH BROMIDE COMPARATOR

This simple compact outfit was developed for rapid and accurate estimation of bromides in the blood according to the method of Dr. Otto Wuth. It is helpful in controlling dosage for prevention of bromide intoxication. Results of test can be read accurately to 12-15 milligrams in 100cc. of blood. Outfit comes complete with full instructions. Price $12.50 f. o. b. Towson, Md.

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If you do not have the LaMotte Blood Chemistry Handbook, a complimentary copy will be sent you, upon request, without obligation.

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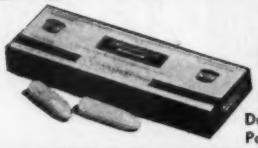

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You assure quality when you specify "WALKER".
100 TABLETS
ASCORBIC ACID
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50 MG.
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Walker VITAMIN PRODUCTS, INC.
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Continued from page 74

Dr. O. M. Marchman, Dallas, recently was awarded a bronze plaque by the Medical Service Society of Dallas, an organization of representatives of pharmaceutical firms, for his cooperation and service.

Dr. William Thomas, Terrell, has been transferred from the staff of Terrell State Hospital to the staff of the State Confederate Home, Austin.

Dr. Earl Smith, Texarkana, has resigned as Director, Texarkana-Bowie County Health Unit and will reside in Tarzana, California.

Dr. H. H. Key, Orange, succeeds Dr. R. W. Williams as Director, Orange City-County Health Unit.

Dr. J. M. Woodall, Big Spring, has been reelected President, Howard County Tuberculosis Association.

Dr. Duan E. Packard, Kerrville, has been appointed Health Officer, Kerr County, to fill the vacancy caused by the death of Dr. John D. Jackson.

Dr. D. Lyle Robertson, Wichita Falls, has been named Director, Wichita Falls Health Unit, succeeding Dr. W. P. Scarlet, who is now City Health Director at Little Rock, Arkansas.

Dr. John J. Keys, Captain, Medical Corps U. S. Army, former Chief of the Orthopedic limb shop, McCloskey General Hospital, Temple, will head an orthopedic team to set up an artificial limb shop in the Philippines to fill the needs of the U. S. Army's Filipino amputees.

Dr. J. J. Whitsitt and Mrs. Dott Causey Strong, both of Houston, were married recently.

Dr. Allen H. Neighbors, Jr., and Miss Peggy Overton were married recently and are residing in Galveston.

Deaths

Dr. Tom Green Curry, Franklin, aged 80, died recently of paralysis.

Dr. Olin Farris Gober, Temple, aged 67, died recently of coronary sclerosis.

Dr. Joseph Henry Graves, Houston, aged 72, died recently.

Dr. Thomas Carlton Honea, Cleburne, aged 63 died recently.

Dr. Walter Lee Jackson, Ranger, aged 57, died March 13 of coronary occlusion.

Dr. John H. B. Jones, Petrolia, aged 78, died recently of pneumonia.

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Improper classification, due to weak reacting testing sera or failure to differentiate A1 from A2 bloods may cause serious trouble—even fatalities.
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Serum "A" (II, Moss), and Serum "B" (III Moss) represent carefully controlled experimental work to furnish the profession carefully tested and titrated grouping sera. Clinically reliable . . . worthy of your confidence. Anti-Rh serum to test for Rh. Absorbed B serum to differentiate between A1 and A2. Anti-M and Anti-N sera for blood spots and paternity work.
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Dr. Roberick Gambrell Lander, Goliad, aged 58, died recently of cerebral hemorrhage.

Dr. Joseph Henry Loving, Wellington, aged 84, died recently of coronary thrombosis.

Dr. Samuel Elmer Ralston, Harlingen, aged 83, died recently of left ventricular failure.

Dr. Gottlieb Werley, El Paso, aged 80, died recently of generalized arteriosclerosis.

Dr. Adair W. White, Houston, aged 57, died recently of carcinoma of the liver.

VIRGINIA

Williamsburg-James City County Medical Society has elected Dr. Henry E. Davis, Williamsburg, President; Dr. J. R. Parker, Providence Forge, Vice-President; and Dr. E. Beamer, Maxwell, Williamsburg, Secretary-Treasurer, reelected.

Wise County Medical Society has elected Dr. J. D. Culbertson, Coeburn, President; Dr. B. C. Henson, Roda, and Dr. Glenn T. Foust, Jr., Norton, Vice-Presidents; and Dr. T. J. Tudor, Norton, Secretary-Treasurer, reelected.

American Dermatological Association will hold its next meeting in Hot Springs, June 10-14.

Dr. Angus K. Wilson, Norfolk, is located in Salt Lake City, Utah.

Dr. Ernest Serrano, Waynesboo, is located in Hollywood, Florida.

Dr. W. H. Bruce, Pennington Gap, has moved to Dungannon.

Dr. Edward B. Jones, Jr., Hampton, succeeds Dr. Carlton H. Waters, as Director of Venereal Disease Control for the Richmond Health Department.

Raiford Hospital, Franklin, was recently opened, having a capacity of 80 beds.

Dr. Henry M. Snead, Petersburg, succeeds Dr. Walter L. L. Barnes as Coroner of Petersburg.

Dr. Benjamin R. Allen, Suffolk, has been anpointed Director of the Bureau of Communicable Diseases, Virginia Department of Health, Richmond.

Dr. Edgar C. Harper, Richmond, has resigned as Director of Tuberculosis Out-Patient Service and Cripoled Children's Bureau, to become Assistant Chief, Tuberculosis Control Program, Fourth District, Veterans Administration.

Dr. Clifford E. Waller, Leesburg, has resigned as Health Officer of Loudoun County.

Dr. Nelson Podolnick, Fairfax, has resigned as Health Officer of Prince William, Fairfax and Stafford Counties to enter private practice in Falls Church.

Dr. William Grossman, Richmond, is taking a postgraduate course in medicine at the University of Virginia.

Dr. Horace A. Albertson, Richmond, and Miss Marie Patterson Van Antwerp, Berkeley, California, were married recently.

Dr. Frank Neville Buck, Jr., Portsmouth, and Miss Alice Marjorie Marshall, Louisia, were married recently.

Dr. Allan B. Warren and Miss Wyclif Scott, both of Orange, were married March 2.

Dr. Peter A. Wallenborn, Jr., Charlottesville, and Miss Dolly Virginia Franklin, Concord, were married March 3.

Deaths

Dr. Richard H. Cobb, Franklin, aged 82, died recently of cerebral hemorrhage.

Dr. Max Leonard Holland, Roanoke, aged 37, died recently of bronchopneumonia.

Dr. Robert Pinckney Fagge, Axton, aged 90, died March 19.

Dr. Robert McCheyne Glass, Winchester, aged 67, died March 18, of a heart attack.

Dr. Thomas McMurray Armistead, Jr., Lynchburg, aged 30, died March 1 of injuries received from a fall.

WEST VIRGINIA

Dr. J. Ross Hunter, Charleston, has been named a member of the Executive Board, American Cancer Society.

Dr. Charles Calhoun Hedges, formerly of Vallejo, California, has been appointed Director of the Bureau of Communicable Diseases, Charleston.

Dr. L. A. Rickerson, Fayetteville, succeeds Dr. R. L. Hunter as County Health Officer for Boone County.

Dr. Russell L. Frankhouser, Pine Grove and Miss Patricia Dodd, Savannah, Georgia, were married March 4.

Deaths

Dr. Ulysses Grant Arnett, Point Pleasant, aged 77, died recently.

Dr. George Hustead Brownfield, Fairmont, aged 74, died March 21 of heart disease.

Dr. George S. Gochenour, Moorefield, aged 88, died recently of senility.

Dr. Daniel James Rudasill, Kingwood, aged 66, died March 29, of coronary thrombosis.

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PALATABLE

Extensively used in Illness and Convalescence
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In Pediatrics — In Geriatrics — And In Between

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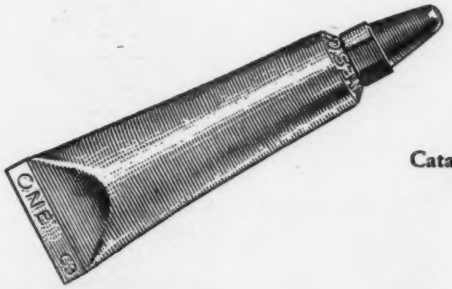

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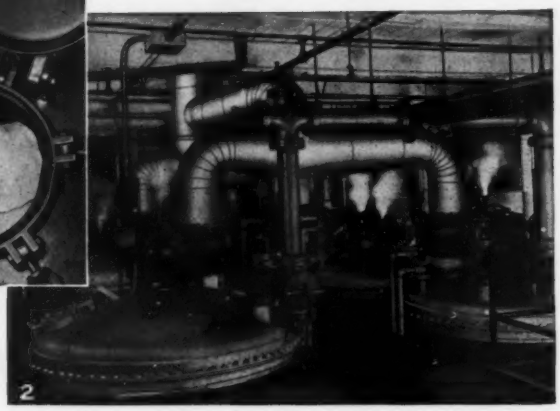


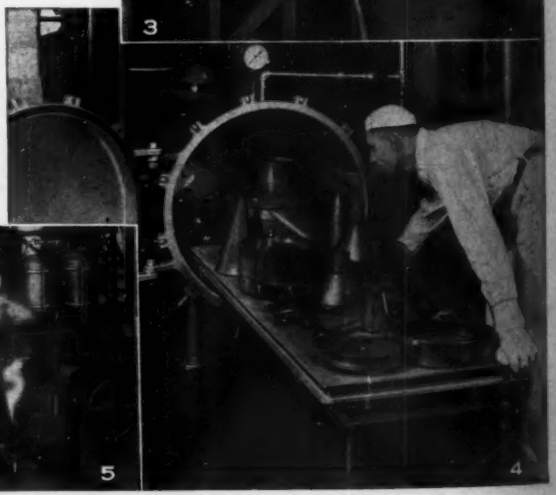
❶ One of many 3,000-gallon converters in which Dextri-Maltose is processed. Interior being thoroughly cleansed by hand prior to steam sterilization.

❷ Steaming under pressure assures sterility of the huge converters for processing Dextri-Maltose.

❸ Sanitary piping—short lengths and readily detachable—is used for conveying Dextri-Maltose. Sections of pipe being cleansed prior to sterilization by live steam pressure.

All DEXTRI-MALTOSE Equipment Is Sterilized by Live Steam Pressure

PHYSICIANS frequently express surprise that the cleansing and steaming of equipment for manufacture of Dextri-Maltose produces sterility comparable to that in hospitals. Huge autoclaves in the Mead Johnson factory steam-sterilize the smaller equipment, and live steam is forced under pressure into storage and processing tanks. This is but one of many precautions taken to make Dextri-Maltose a *carbohydrate safe for infants*. Unremitting care in laboratory and factory has resulted in a product which over many years has had an extraordinarily low bacterial count. Every step in the process of making Dextri-Maltose is under the eyes of competent bacteriologists.

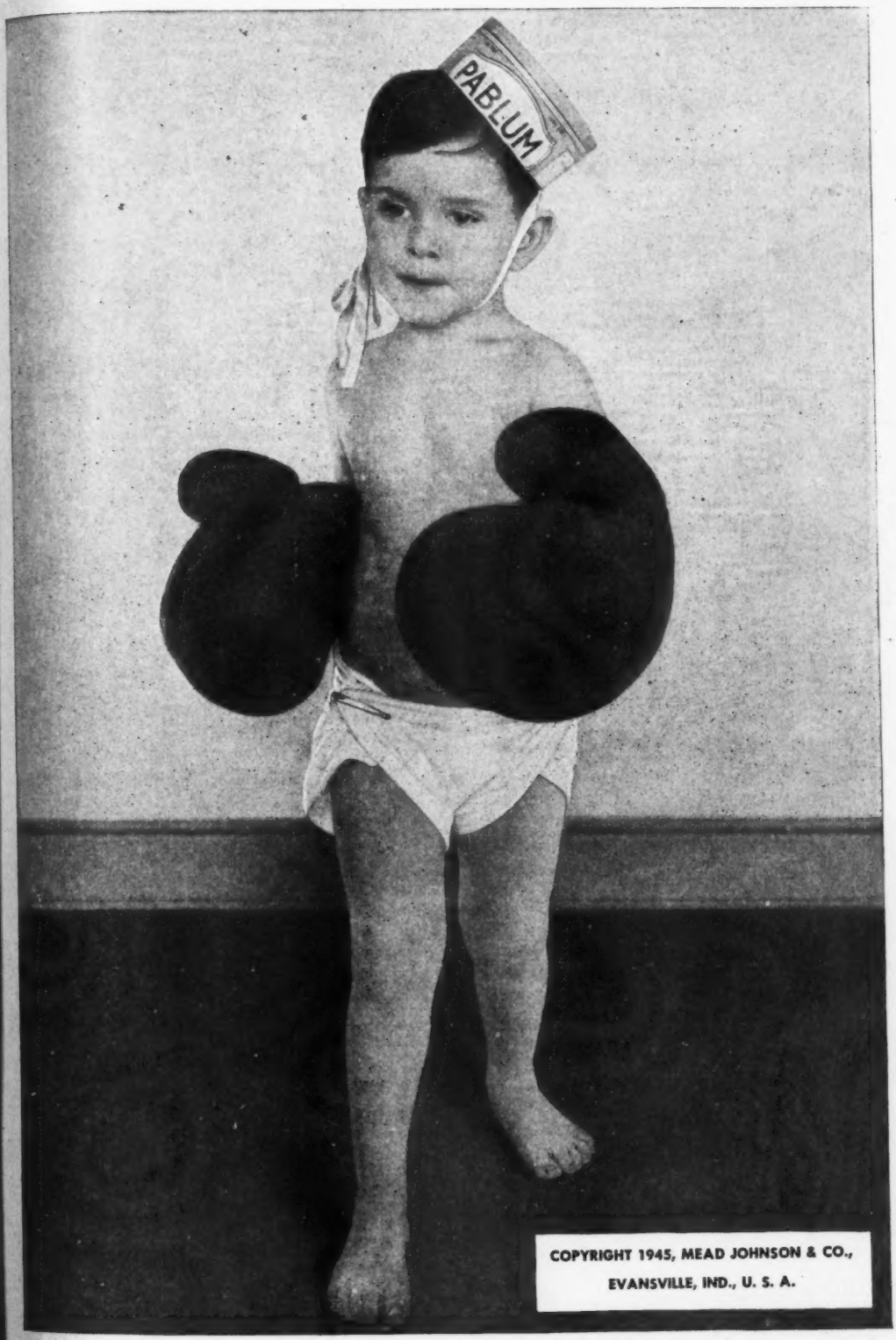


❹ Movable equipment used in the manufacture of Dextri-Maltose is sterilized in large hospital-type autoclaves at 20 pounds' steam pressure (259°F. for 20 minutes).

❺ Steaming under pressure sterilizes Dextri-Maltose filter presses.

MEAD JOHNSON & COMPANY, EVANSVILLE, INDIANA, U.S.A.

Please enclose professional card when requesting samples of Mead Johnson products to co-operate in preventing their reaching unauthorized persons



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OUT OF EVERY 200 PERSONS is an epileptic. Economic loss, measured in money, is tremendous—amounting to $60,000,000 annually.*

The toll . . . sorrowfully higher when measured in heartaches and wrecked lives . . . is being reduced with DILANTIN SODIUM, the modern, superior anticonvulsant.

DILANTIN SODIUM affords the epileptic patient a more normal productive life, for it reduces the number or severity of convulsive seizures . . . in addition to being comparatively free from the undesirable effects of the bromides and barbiturates.

DILANTIN SODIUM

DILANTIN SODIUM (Diphenylhydantoin Sodium) is available in Kapseals of 0.03 Gm. (½ gr.), and 0.1 Gm. (1½ gr.), in bottles of 100, 500, and 1000.

*Yahraes, Herbert: *Epilepsy—The Ghost Is Out of the Closet*, Public Affairs Pamphlet No. 98.

DILANTIN SODIUM

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